Questions and Answers in K’iche’

Dissertation

Presented in Partial Fulfillment of the Requirements for the Degree
Doctor of Philosophy
in the Graduate School of The Ohio State University

By
Şevket Murat Yasavul

Graduate Program in Linguistics
The Ohio State University
2017

Dissertation Committee:
Carl Pollard (co-advisor)
Judith Tonhauser (co-advisor)
Robert Levine
Abstract

This thesis investigates the structure and interpretation of questions and answers in K’iche’, an indigenous Mayan language of Guatemala, and aims to accomplish two interrelated goals. The first goal is to extend the limited previous work on questions and answers in K’iche’ in order to come to a better understanding of the language. The second goal is to bring theoretically interesting data from an understudied language like K’iche’ to bear on the modeling of question-answer exchange in discourse and thereby to facilitate an informed comparison between K’iche’ and well-studied languages like English, and study the implications of the data for the formal analysis of questions and answers.

I first discuss two focus constructions with different interpretations in K’iche’ and distinguish between (what I call) answer focus constructions from aree focus constructions. I show that the interpretation of aree focus constructions gives rise to existence and exhaustivity implications (the latter when they are used to reply to constituent questions), neither of which necessarily arises from the interpretation of answer focus constructions. Previously, differences in the interpretations of these two focus constructions were either overlooked (e.g., Larsen, 1988; Trechsel, 1993) or not explicitly shown to be the case (Can Pixabaj & England, 2011). Moreover, this finding goes against the standard assumption, based on Aissen 1992, that focus constructions in Mayan are interpreted like it-clefts across the board.

Next, I discuss the distribution and interpretation of negation in K’iche’ both in non-focus sentences and in focus constructions. In particular, I show that in answer focus constructions, the negation clitic =t(aj) ‘NEG’ has a variable distribution which has not been noted in the previous literature: it attaches to a prosodic word of the expression in the pre-predicate focus position but not necessarily to the first one (contra Henderson 2012). Interestingly, this variability in distribution has
no effect on the interpretation of the sentence. The distribution of negation in aree focus constructions, on the other hand, is similar to its distribution in non-focus sentences: the clitic \( =t(aj) \) ‘NEG’ attaches to the first prosodic word of the predicate of the sentence to be negated.

Based on how negative answers are formed and interpreted in K’iche’, I show that there are two different kinds of negative responses to positive constituent questions with different structures and interpretations. In the first kind of negative response, \( =t(aj) \) ‘NEG’ attaches to a prosodic word of the focused expression and I argue that this kind of response qualifies as a negative answer. For the second kind of negative response, where \( =t(aj) \) ‘NEG’ occurs on the verbal part of the sentence, I show that the preverbal expression is not focused but rather contrastively topicalized. I argue that this kind of response, although possible, does not qualify as an answer in the technical sense. Building on these observations, I take up the much-discussed issue of association with focus (e.g., Jackendoff, 1972; Rooth, 1996; Beaver & Clark, 2008; Herburger, 2016) in negative answers and argue that the facts about K’iche’ motivate an alternative analysis which has implications for English. I propose an analysis of negative answers and negative responses in K’iche’ and in English, without making recourse to association with focus or a mechanism to achieve that effect. The analysis also has the interesting implication that English does not have long negative answers.

Next, I turn to a discussion of broad focus and narrow focus polar questions in K’iche’. In particular, I show that the interpretation of a negative polar question in K’iche’ gives rise to the inner versus outer negation ambiguity and that, similar to languages like English and German, this ambiguity has a morphosyntactic reflex (e.g., Ladd, 1981; Büring & Gunlogson, 2000).

I then discuss narrow focus polar questions and consider the relevance of inner versus outer negation to the interpretation of negative narrow focus polar questions. In particular, I show that the distribution of negation in narrow focus polar questions is sensitive to the inner versus outer negation interpretations associated with negative polar questions: negation occurs in the preverbal domain if the question has an outer negation interpretation and in the verbal domain if the question has an inner negation interpretation. Thus, the distribution of negation in narrow focus polar questions proves to be another morphosyntactic reflex of the inner/outer negation ambiguity in K’iche’.

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In order to provide a compositional analysis of the K’iche’ data, I extend the dynamic context model put forth in Martin 2013 and Martin & Pollard 2014, and develop a neo-Hamblinian analysis of questions and answers, which is based on the original definition of questions in Hamblin 1957 and Hamblin 1971. This dynamic analysis improves on and, in certain respects, is similar to previous approaches to the question-answer relation, especially those that employ a Question Under Discussion (QUD)-stack (e.g., Ginzburg, 1994; Roberts, 1996/2012; Farkas & Bruce, 2009).

Finally, I discuss a number of remaining issues, and suggest several future avenues for research on the grammar of K’iche’.
Acknowledgements

This thesis is a result of several years of work which could not have been completed without the help and support of many individuals. It is my sincere hope that, at the very least, I can duly acknowledge them and offer my humble thanks.

First and foremost, I would like to express my deepest gratitude to my advisors Carl Pollard and Judith Tonhauser. It would not have been possible to undertake the daunting endeavor of writing a Ph.D. thesis without their continuous support, guidance, patience, and encouragement.

Carl has started out as an advisor, became a mentor, and eventually a friend with whom I can talk to virtually about anything. He has always been kind, careful, funny, patient, insightful, and incredibly generous with his time. His enthusiasm for the subject matter of linguistics has continuously amazed me and I always found the motivation that I needed after long and intellectually stimulating meetings with him. He usually was the one who asked questions that no one else did, pushed me to think harder and be more precise, and gave pointers which not only improved the quality of my work but also shaped the way that I think about linguistic analysis. I consider it a privilege to have worked with him and to have had his unending support throughout all these years.

I started working on K’iche’ out of pure coincidence. I remember blindly saying “yes” when Judith asked me whether I would like to work with a speaker of K’iche’ that she and Dave Odden had found—but decided not to work with—for their field methods class. That’s how I met Raul Castro, my language consultant in Columbus, and his wife Heather Dean. I couldn’t have foreseen at the time that a research project would grow out of this connection which would eventually result in this thesis. Judith guided, supported, and encouraged me throughout years of fieldwork on K’iche’. She was not only interested in my progress as a graduate student but also in my professional development as a linguist, helped me set goals that were realistic and achievable, and made sure that I worked towards them. She cared deeply about fieldwork methodology and posed intriguing questions about
the data I collected and the analyses I proposed. It was often those questions that made me get clearer on important issues and consider how my work situated in the larger scheme of things. I admired her sense of discipline and her high standards, and I profoundly valued her cool-headedness and understanding at difficult times.

I am also grateful to my third committee member Bob Levine who has showed an interest in my work on K’iche’ since the time he agreed to read and discuss my first qualifying paper. His comments, questions, and advice back then and now proved invaluable, and I found his willingness to exchange ideas and his seemingly unending enthusiasm fascinating.

I am exceptionally indebted to my language consultants Raul Castro, Juana Pérez Gómez, Marí Caal Solis, and María Hernandez Us for their judgments, insights and patience. They spent countless hours with me, sharing their knowledge and helping me better understand numerous points about K’iche’. They were extremely accommodating, took the research I was doing seriously, and showed genuine interest in the success of my work more than anything else. I always came away with the feeling that they enjoyed the work I was doing and appreciated their language as much as I did.

I benefited greatly from conversations with Judith Aissen, Scott AnderBois, Cynthia Clopper, Peter Culicover, Nora England, Robert Henderson, Yusuke Kubota, Scott Martin, Craige Roberts, and Chris Worth about the data and analyses that I present in this thesis. Although I don’t expect them to necessarily agree with what I did in this thesis or how I did it, I would like to thank them for their time, insights, criticisms, and advice.

I feel honored to have received a Presidential Fellowship from the Graduate School at Ohio State. This fellowship freed me up to work on my thesis for a full year which included carrying out the necessary fieldwork on K’iche’ to complete it. I am thankful to Scott AnderBois, Phillippe de Groote, Carl Pollard, Mandy Simons, and Judith Tonhauser for their role in helping me get this fellowship. Over the years, the fieldwork research that culminated in this thesis was supported by a Dissertation Improvement Grant from the National Science Foundation (BCS-1451628), a Tinker Field Research Grant from the Tinker Foundation, a Global Gateway Research Grant from the Office of International Affairs’ Global Gateway Program and the Council of Graduate Students
at Ohio State, an Alumni Grant for Graduate Research and Scholarship from the Graduate School at Ohio State, as well as funding from the Department of Linguistics and the College of Arts and Humanities at Ohio State, all of which I gratefully acknowledge.

I would like to thank Heather Dean and Raul Castro for helping me arrange my first trip to Guatemala and get ready for the life in Santa María Tzejá. I owe countless thanks to Victoriano Canil, Carlos Canil, Juana Reyes, and Randall Shea for their help, hospitality and for making sure that my time in Santa María Tzejá was comfortable and productive. I also thank Mario Hernandez for helping me navigate in Guatemala, and Manuel Canahuí, Carlos Guillermo, Erik Monterroso, and Alberto Ovando for their friendship and for making my trips to Guatemala a fun experience each time.

My heartfelt thanks are due to Jane Mitsch, MariBeth Mulholland, Harry Warner, and Chris Worth for being there especially at difficult times during which I had to keep working on this thesis. I also thank Jefferson Barlew, Manjuan Duan, Shontael Elward, Nick Hoover, Greg Kierstead, Marivic Lesho, Bertan Mantıktçı, Justin Palo, Andy Plummer, Nathaniel Powell, Pat Reidy, Eric Ruppe, Abby Walker, Kodi Weatherholtz, and Aydoğan Yanılmaz who offered their help, support and friendship since I began my doctoral studies. I am especially grateful to Andy, Eric, Jane, Manjuan, and Marivic for taking good care of Cuddles and to Cuddles for being Cuddles. Special thanks are due to Julie McGory who would offer her experience and practical advice to keep me grounded, and when those were not applicable, a listening ear and understanding which I appreciated. I also thank Jon Dehdari for his “osuthesis” L\TeX template which I used to typeset this document.

Finally, I am grateful to my family for their unconditional love, support and understanding without which I could never have completed this doctoral degree. Thank you.
M.S. in Cognitive Science, Middle East Technical University, 2009.

B.S. in Mathematics, Middle East Technical University, 2006.

Presidential Fellow, The Ohio State University, 2015 - 2017.


Graduate Teaching Associate, The Ohio State University Department of Linguistics, 2010 - 2017.

University Fellow, The Ohio State University, 2009.

Publications


Fields of Study

Major Field: Linguistics
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### Abbreviations

A1(p)  absolutive first person singular (plural)  DAT  dative
A2(p)  absolutive second person singular(plural)  DEM  demonstrative
A3(p)  absolutive third person singular(plural)  DET  determiner
E1(p)  ergative first person singular (plural)  DIR  directional
E2(p)  ergative second person singular(plural)  EXPL  expletive
E3(p)  ergative third person singular(plural)  FOC  focus particle
AG  agent focus  FUT  future particle
ALT  alternative  ICP  incompletive
ASP  aspect  INS  instrumental
CAUS  causative  INS  instrumental
CL  clitic  NEG  negative particle
CLF  classifier  PART  particle
CMP  completive  PL  plural
COM  comitative  PREP  preposition
COMP  complementizer  PROG  progressive
CON  consequential  Q  question particle
D2  distal deixis  RES  resultative
D4  location/negation  SS  status suffix
Chapter 1

Introduction

The aim of this thesis is to explore the structure and interpretation of questions and answers in K’iche’, an indigenous Mayan language spoken by over a million people in the central and western highlands of Guatemala (Richards, 2003). Previous studies on K’iche’ (e.g., Mondloch, 1978, 1981; Larsen, 1987, 1988; Trechsel, 1993; López Ixcoy, 1997; Can Pixabaj, 2010; Aissen, 2011), concentrated mostly on morphosyntactic phenomena without much discussion or a careful and in-depth analysis of the semantics and pragmatics of the question-answer relation. However, alongside the morphosyntax of questions and answers, which merit an analysis for a better understanding of the language, certain facts about K’iche’ are illuminating for a general theory of questions and answers, as I discuss in detail in chapters 3, 4 and 5. In particular, I concentrate on the following three main phenomena in the grammar of K’iche’ (to be elaborated in more detail below):

1. Focus constructions: answer and aree focus constructions,

2. Negation: the distribution and interpretation of negation in non-focus sentences and in focus constructions,

3. Polar questions: repeat answers to polar questions; negation in broad focus polar questions and in narrow focus polar questions, and its relation to the interpretation thereof.

From a broader perspective, the data and the formal analysis I provide for the above phenomena in K’iche’ have implications for the structure of discourse context, the analysis of question-answer anaphora, the analysis of cleft-like constructions, the analysis of negative answers, and the analysis of (negative) polar questions. I take up these issues as they arise in subsequent chapters and discuss
their theoretical significance. At the same time, by bringing novel data from an understudied and
typologically different language to bear on the modeling of question-answer exchange in discourse,
I aim to facilitate an informed comparison between K’iche’ and well-studied languages like English,
on which the formal analyses of questions and answers are typically built. In §1.1, I briefly point out
the main empirical and theoretical contributions in the context of K’iche’ as well as in the context
of semantic/pragmatic analysis of the aforementioned topics.

While I extend the previous work on the topics above in terms of empirical breadth in order
to arrive at better empirical generalizations, I also aim for theoretical rigor in the formal analysis
I provide of the interactions between questions, answers and negation in K’iche’. To that end, I
develop a compositional, dynamic analysis of the above phenomena based on an elaboration of the
dynamic context model put forth in Martin 2013, Martin & Pollard 2014, and Martin 2016. The
framework I use, Dynamic Categorial Grammar (DyCG), comes equipped with a compositional
dynamic semantics interfaced with a categorial grammar, which I employ to build a fragment of
K’iche’ in a formally precise fashion.

In the rest of this chapter, I provide an outline of the chapters in this thesis as well as the
necessary background on K’iche’ morphosyntax. I also describe the fieldwork that was carried out
and the fieldwork methodology that was used to collect the data that my analyses build on.

1.1 Thesis outline

The remainder of this thesis is organized as follows.

Chapter 2: In chapter 2, I start with an introduction to Linear Categorial Grammar (LCG, Pollard
& Smith, 2012; Mihaliček, 2012; Mihaliček & Pollard, 2012; Pollard, 2015; Worth, 2016), a linear
logic based form of categorial grammar that Dynamic Categorial Grammar (DyCG) builds on. I lay
out the details of LCG and provide several examples illustrating its grammar architecture, before
I turn to the details of DyCG. DyCG follows the tradition in dynamic semantics, e.g., Kamp 1981
and Heim 1982, and treats the meaning of utterances of (declarative and interrogative) sentences as
functions from contexts to contexts. Therefore, the dynamic meanings I discuss in this thesis call at the outset for an understanding of the DyCG context model, which I cover in chapter 2.

DyCG not only provides the framework within which I formalize the semantics of questions and answers in chapter 3 but also the mechanism to model morpho-phonological phenomena in the grammar of K’iche’. For example, as I discuss in chapter 4, to capture the variable distribution of the negation clitic \(=(a)j\) ‘NEG’ in answer focus constructions, I make use of the explicit phonological component of DyCG, called the phenogrammar. Phenogrammar allows the specification of the precise options for the placement of \(=(a)j\) ‘NEG’ in a way that only changes the string realization and not the meaning or the shape of the parse tree, thus capturing the observation that the variable distribution of \(=(a)j\) ‘NEG’ does not have an effect on the meaning.

**Chapter 3**: I introduce the core data that this thesis aims to account for in chapter 3. I discuss two focus constructions with different interpretations in K’iche’ and, in particular, distinguish between (what I call) answer focus constructions and aree focus constructions. I show that the interpretation of aree focus constructions gives rise to existence and exhaustivity implications (the latter when they are used to reply to constituent questions), neither of which necessarily arises from the interpretation of answer focus constructions. Previously, differences in the interpretations of these two focus constructions were either overlooked (e.g., Larsen, 1988; Trechsel, 1993) or not explicitly shown to be the case (Can Pixabaj & England, 2011). Moreover, this finding goes against the standard assumption, based on Aissen 1992, that focus constructions in Mayan are interpreted like *it*-clefts across the board.

Focus constructions are a much-discussed topic in Mayan linguistics (among many others, Norman, 1977; Mondloch, 1978; Larsen, 1988; England, 1991; Aissen, 1992; Trechsel, 1993; López Ixcoy, 1997; Tonhauser, 2003a; Stiebels, 2006; AnderBois, 2012; Shklovsky, 2012; Verhoeven & Skopeteas, 2015). In this thesis, I follow the previous literature on Mayan and use ‘focus constructions’ as a descriptive term but I do not assume a theoretical notion of ‘focus’ in my account of the K’iche’ phenomena. For example, I do not assume that what is called focus “is contrastive”, “is the
most important/new information”, “evokes alternatives”, “answers the question”, etc. Rather, the analysis I propose treats what are called focus constructions on a case by case basis based on their discourse function. Certainly, they may exhibit certain similarities, e.g., a change in the basic word order (more on this below), but I do not assume that they all are instances of one particular phenomenon called ‘focus.’ This is similar to saying that, say, in English, “answers (or foci in answers) bear such and such a tune” rather than saying “such and such a tune means answer focus.” In general, the analysis I develop of the two focus constructions in K’iche’ is in the same spirit as the scopal analysis of focus in Rooth 1996 despite being different in details. I elaborate more on this point in chapter 3.

For the formal analysis of questions and answers, I extend the dynamic context model put forth in Martin 2013 and Martin & Pollard 2014 in order to have an enriched ontology suitable for an analysis of the anaphoric processes that characterize the syntax and semantics interface of questions and answers. The dynamic theory of questions and answers I develop is based on the original definition of questions in Hamblin 1957 and Hamblin 1971. In this neo-Hamblinian theory, an accepted question introduces a discourse referent (DR) into the context and answers are analyzed as anaphoric to this DR. Answering a question in discourse thus becomes specifying the DR introduced by the question, which, upon acceptance, is pushed onto a stack which keeps track of accepted questions. This dynamic analysis improves on and, in certain respects, is similar to previous approaches to the question-answer relation, especially those that employ a Question Under Discussion (QUD)-stack (e.g., Ginzburg, 1994; Roberts, 1996/2012; Farkas & Bruce, 2009).

Employing a dynamic theory for the analysis of questions and answers, I believe, is well-motivated since the relationship between a question and an answer is ultimately one of anaphora. An answer is interpreted with respect to the question it answers and should, therefore, have access to the meaning of the question it is an answer to. This relationship is what makes a possible follow-up to a question an answer and what makes an answer different from merely being an imaginable way in which one could reply to a question. For example, while (1b) and (1c) are answers, (1d), with
a contrastive topic accent on Greg, and (1e), (1f) and (1g) are not answers but merely acceptable replies.

(1) a. Who’s going to dinner with the colloquium speaker?
   b. Chris (is going to dinner with the colloquium speaker).
   c. Chris and Scott (are going to dinner with the colloquium speaker).
   d. Greg isn’t (going to dinner with the colloquium speaker).
   e. I don’t know.
   f. I’ll get back to you on that.
   g. It’s a nice day today.

Since dynamic theories are well-suited to handle anaphora, a dynamic account should lend itself to a satisfactory analysis of the anaphoric relationship between a question and an answer. The analysis of answer focus constructions I develop in this thesis is based on this background assumption about the question-answer relation. As such, it is in the same vein as the analysis proposed in Groenendijk & Stokhof 1984, Ginzburg & Sag 2000 and Jacobson 2016, which hold that a question-answer pair is a discourse unit with its own syntax and semantics.

In chapter 3, I also begin to construct a fragment of K’iche’ and provide a compositional dynamic analysis of the two focus constructions which forms the basis for the analyses in subsequent chapters.

**Chapter 4:** In chapter 4, I discuss the distribution and interpretation of negation in K’iche’ both in non-focus sentences and in the two focus constructions I discuss in chapter 3. In particular, I show that in answer focus constructions, the negation clitic =t(aj) ‘NEG’ has a variable distribution which has not been noted in the previous literature: it attaches to a prosodic word of the expression

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1See §4.4 for more on negative replies to constituent questions in English.
2As Krifka (2001) points out a reply like (1g) is either completely off the mark or it induces certain conversational implicatures.
in the pre-predicate focus position but not necessarily to the first one (contra Henderson 2012). Interestingly, this variability in distribution has no effect on the interpretation of the sentence. The distribution of negation in aree focus constructions, on the other hand, is similar to its distribution in non-focus sentences: the clitic =t(aj) ‘NEG’ attaches to the first prosodic word of the predicate of the sentence to be negated. I provide a detailed analysis of the interaction between negation and focus constructions in K’iche’ which is both empirically and theoretically superior to previous accounts.

Based on how negative answers are formed and interpreted in K’iche’, I show that there are two different kinds of negative responses to positive constituent questions with different structures and interpretations. In the first kind of negative response, =t(aj) ‘NEG’ attaches to a prosodic word of the focused expression and I argue that this kind of response qualifies as a negative answer. For the second kind of negative response, where =t(aj) ‘NEG’ occurs on the verbal part of the sentence, I show that the preverbal expression is not focused but rather contrastively topicalized. I argue that this kind of response, although possible, does not qualify as an answer in the technical sense. Building on these observations, I take up the much-discussed issue of association with focus (e.g., Jackendoff, 1972; Rooth, 1996; Beaver & Clark, 2008; Herburger, 2016) in negative answers and argue that the facts about K’iche’ motivate an alternative analysis which has implications for English. I propose an analysis of negative answers and negative responses in K’iche’ and in English, without making recourse to association with focus or a mechanism to achieve that effect. The analysis also has the interesting implication that English does not have long negative answers.

Finally, I augment the K’iche’ fragment with an analysis of negation. In particular, I employ the mechanisms that DyCG provides to capture in a compositional way the distribution of negation across different sentences as well as the interpretation of answer focus constructions and their interaction with negation.

**Chapter 5:** In chapter 5, I start with a discussion of the two ways in which polar questions are formed in K’iche’ and the form that their answers take. In K’iche’, as in languages like Finnish (Holmberg, 2001), Irish (McCloskey, 1991), Russian (King, 1994), and Welsh (Sadock & Zwicky,
1985), answers to polar questions are formed by repeating (or negating) the predicate in question.

Next, I take up negative polar questions and, in particular, the ambiguity that is exhibited by such questions, namely the inner and outer negation interpretations (e.g., Ladd 1981; Büring & Gunlogson 2000; Han & Romero 2004). It has been noted that a negative polar question like *Isn’t Jane coming?* can be understood as a question about the negative proposition *Jane isn’t coming*, which corresponds to the inner negation interpretation. This is the interpretation where the speaker wants to double-check the negative proposition *Jane isn’t coming* after facing evidence against the truth of the proposition *Jane is coming*. The same question can also be understood as a question about the positive proposition *Jane is coming*, which corresponds to the outer negation interpretation. This is the interpretation where the speaker wants to confirm or double-check the positive proposition *Jane is coming*. I show that the interpretation of a negative polar in K’iche’ gives rise to the same ambiguity and that, similar to languages like English and German (e.g., Ladd, 1981; Büring & Gunlogson, 2000), this ambiguity has a morphosyntactic reflex.

Then, I turn to a discussion of narrow focus polar questions, namely those polar questions which have a focused expression in the preverbal position. In contradistinction to broad focus polar questions, narrow focus polar questions cannot be answered by repeating (or negating) the predicate in question. Rather, their answers take the form of the repetition and/or pronominalization of the expression in the focus position or the negation thereof. After discussing the interpretation of narrow focus questions, I take up the relevance of inner versus outer negation to the interpretation of negative narrow focus polar questions. In particular, I show that the distribution of negation in narrow focus polar questions is sensitive to the inner versus outer negation interpretations associated with negative polar questions: negation occurs in the preverbal domain if the question has an outer negation interpretation and in the verbal domain if the question has an inner negation interpretation. Consequently, the distribution of negation in narrow focus polar questions proves to be another morphosyntactic reflex of the inner/outer negation ambiguity in K’iche’.

I conclude chapter 5 by augmenting the K’iche’ fragment with an analysis of polar questions and narrow focus polar questions and their answers.
In chapter 6, I conclude with a summary of the main claims and findings of this thesis and suggest areas for future research.

In the next section, I provide the necessary background on K’iche’ morphosyntax.

1.2 Background on K’iche’ morphosyntax

1.2.1 Basic clause structure in K’iche’

K’iche’ has an ergative-absolutive agreement system (Larsen, 1988) which is preserved throughout changes in aspect and clause type (Pye, 2001). The basic word order is VS in intransitive clauses and VOA in transitive clauses (Larsen, 1988; England, 1991). There is no case-marking on noun phrases, e.g., on ri achi ‘the man’ in (2), to identify grammatical relations or semantic roles; these are read off of finite predicates by means of the ergative and absolutive cross-reference markers given in Table 1.1 below.

(2) x-Ø-war ri achi.
   CMP-A3-sleep DET man
   ‘The man slept.’

<table>
<thead>
<tr>
<th></th>
<th>Preconsonantal</th>
<th>Prevocalic</th>
<th>Absolutive</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>in-</td>
<td>inw/-w-</td>
<td>A1 in-</td>
</tr>
<tr>
<td>E2</td>
<td>aa/-a-</td>
<td>aw-</td>
<td>A2 at-</td>
</tr>
<tr>
<td>E3</td>
<td>uu/-u-</td>
<td>r-</td>
<td>A3 Ø-</td>
</tr>
<tr>
<td>E1p</td>
<td>qa-</td>
<td>q-</td>
<td>A1p uj/-oj-</td>
</tr>
<tr>
<td>E2p</td>
<td>ii-</td>
<td>iw-</td>
<td>A2p ix-</td>
</tr>
<tr>
<td>E3p</td>
<td>ki-</td>
<td>k-</td>
<td>A3p e’/-eb’/-ee-</td>
</tr>
</tbody>
</table>

Table 1.1: Ergative and absolutive agreement markers

Following Dixon 1994, I use S to refer to the single argument of an intransitive predicate, A to the more agent-like argument of a transitive predicate, and O to the more patient-like argument of a transitive predicate.

Unless otherwise stated, all the data I present are from original fieldwork in Santa María Tzejá, Ixcé, El Quiché, Guatemala and Columbus, Ohio, USA. In the orthography, all symbols have their standard phonetic value except the following: ’ = glottal stop, C’ = glottalized consonant, VV = long vowel, ch = [tʃ], tz = [ts], x = [[]], and j = [x] or [x].
The absolutive markers are used to cross-reference, i.e., to register the number and person features of, the S argument of an intransitive predicate and the O argument of a transitive predicate. For example, in (2), the sole argument ri achi ‘the man’ is cross-referenced on x-∅-war ‘s/he slept’ by the phonologically null, third person singular absolutive marker ∅- ‘A3’ preceding the verb root war ‘sleep’. The absolutive marker is preceded by the aspect marker x- ‘CMP’.\footnote{There are three aspectual markers in K’iche’: k(a)- incompletive/imperfective; x- completive/perfective; ∅- perfect. There is also the imperative/potential mood marker ch(-t)- (Larsen, 1988; Trechsel, 1993).} In (3) below, where the argument of the verb is not realized, there is also the so-called status suffix -(i)k ‘SS’ following the verb root. This suffix marks the end of an intonational phrase (Henderson, 2012), and it is used for intransitive verbs in the incompletive and completive aspects.

(3) x-at-war-ik.
CMP-A2-sleep-SS
‘You slept.’

Before I discuss sentences with transitive predicates, a quick note about terminology is in order. As with other Mayan languages, a distinction is usually made between two kinds of predicates in K’iche’: (i) verbs (or verbal predicates) and (ii) non-verbal predicates (Larsen, 1988; López Ixcoy, 1997; Can Pixabaj, 2010). Verbs can be intransitive, as in (2) and (3) above, or transitive, as in (4) below, and they carry aspect, mood and person markers. Non-verbal predicates, e.g., nouns and adjectives, on the other hand, can only be inflected with person markers. An example of a sentence with a non-verbal predicate is given in (5).

(4) x-at-u-to’-o.
CMP-A2-E3-help-SS
‘S/he helped you.’

(5) at-achi.
A2-man
‘You are a man.’

The second set of markers in Table 1.1, namely the ergative markers, are used to cross-reference the A argument of a transitive predicate. In (4), for example, the transitive verb x-at-u-to’-o ‘s/he
helped you’ carries the absolutive marker at- ‘A2’, which cross-references the O argument. The absolutive marker precedes the ergative marker u- ‘E3’, which cross-references the A argument. The ergative marker, in turn, precedes the verb root to’ ‘help’. Like intransitive verbs, transitive verbs carry phrase-final suffixes when they occur at the end of intonational phrases (Henderson, 2012). For example, in (4), the verb root is followed by the status suffix -o.6

Since K’iche’ does not use overt case marking, the argumenthood of expressions is indicated by the absolutive and ergative markers. For example, it is the absolutive marker -/ 0- ‘A3’ that identifies ri achi ‘the man’ as the O argument in (6), and it is the ergative marker -u- ‘E3’ that identifies ri achi ‘the man’ in (7) as the A argument (Trechsel, 1993).

(6) x-/ 0-a-to’
   CMP-A3-E2-help DET man
   ‘You helped the man.’

(7) x-at-u-to’
   CMP-A2-E3-help DET man
   ‘The man helped you.’

In the next section, I briefly review some properties of word order in K’iche’.

1.2.2 Word order in K’iche’

A general claim about Mayan languages, dating back to Norman 1977, is that they have a verb-initial basic word order7 and that there are also two special positions preceding the verb which constituents can occupy for pragmatic purposes. Based on Norman 1977, Larsen (1988:337) writes that immediately preceding the verb in K’iche’ is a position into which a “more prominent constituent” may be placed. He refers to this position as the “Focus Position” because the constituents

---

6The form of the status suffix for transitive verbs can be -u, -o or -j depending on the derivational status of the stem (Trechsel, 1993). The status suffixes simultaneously register (in)transitivity, aspect and, in the case of transitive verbs, the derivational status of the stem (Pye, 2001).

7One could say that Mayan languages are predicate-initial, too. However, the descriptions are usually based on the traditional way of talking about word order as VOS, VSO, SVO, etc.
in this position “are generally understood to be “focused” (i.e., contrastive),” which is reflected in the cleft or pseudo-cleft translations into English. An example is given in (8), where the focused expression (lee) ch’oh ‘(the) mice’ occupies the preverbal focus position (translations are Larsen’s).

(8) Context: Who/what ate the clothes?

(lee) ch’oh x-ee-k’ux-uw  lee  atz’yaq.
DET  mice  CMP-A3P-eat-AG  DET  clothes
‘(It was) (the) MICE (that) ate the clothes.’ (Larsen, 1988:336)

Note that the change in the basic word order is accompanied by a change in the verb form in (8), where the verb x-ee-k’ux-uw ‘CMP-A3P-eat-AG’ carries the agent focus marker -uw ‘AG’. The agent focus marker is characteristic of focus constructions in Mayan (see e.g., Mondloch 1981; Larsen 1988; Trechsel 1993; Aissen 2011 for K’iche’ and Dayley 1981; Aissen 1999 and Stiebels 2006 for other Mayan languages), and it is used when the ergative argument of a transitive verb is focused. In (8), the agent focus form is expressed by (i) the absence of an ergative marker on the verb, and (ii) the presence of the agent focus marker. When the verb carries an agent focus marker, the interpretation is always that the preverbal expression, which denotes the agent of the action, is focused. Larsen (1988) points out that the agent focus form can never be used in basic transitive clauses.

In the preverbal domain, there is “another special position which Norman called the ‘theme’ (i.e., the main discourse topic),” which Larsen refers to as the “Topic Position” (Larsen, 1988:337) An example is given in (9) where the topicalized expression lee ch’oh ‘the mice’ occupies the topic position and where the verb is not marked by the agent focus marker.

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8 This marker comes in two forms: -(V)w for root transitive verbs, and -n for derived transitive verbs (Trechsel, 1993).
9 Although it is widely cited as a concomitant of focusing ergative arguments, the use of agent focus marker was not obligatory for my consultants and they were not making use of this form in elicitation sessions. Larsen (1988:505) also reports that using agent focus is optional even when its use is permissible. See also Norcliffe 2009 on the optional use of agent focus marker in Yucatec.
(9) Context: What happened? What did the mice do?

Lee ch’oh x-∅-ki-k’ux leez’yaq.
DET mouse CMP-A3-E3P-eat DET clothes
‘The mice (, they) ate the clothes.’ (Larsen, 1988:335)

When both the topic and the focus positions are occupied by linguistic expressions, the topicalized expression precedes the focused expression, as exemplified in (10), where the topicalized expression lee ch’oh ‘the mice’ precedes the focused expression atz’yaq ‘clothes’. Thus, the preverbal order is TOPIC FOCUS V (among others, Norman, 1977; Larsen, 1988; England, 1991; Can Pixabaj & England, 2011).

(10) Context: What did the mice eat?

Lee ch’oh, atz’yaq x-∅-ki-k’ux-u.
DET mouse clothes CMP-A3-E3P-eat-SS
‘The mice, (it was) CLOTHES (that) they ate.’ (Larsen, 1988:335)

The two word orders I discussed in the previous section, namely the VS and VOA word orders, characterize the word order in basic declarative sentences and do not involve topicalization or focus. Larsen (1987:40) points out that in texts it is relatively uncommon to find the A, O or the S arguments in post-predicate positions unless they are realized as non-pronominal arguments. As for pronominal arguments, he notes that they rarely appear in argument positions, but that they are used in some cases to indicate “contrastive emphasis” or change of subject, by which he presumably refers to focus and topic, respectively. These pronouns, given in Table 1.2 below, can occupy the pre-verbal positions when they are focused or topicalized, and are identical to the absolutive markers except for the third person singular and plural.

<table>
<thead>
<tr>
<th>1sg</th>
<th>in</th>
</tr>
</thead>
<tbody>
<tr>
<td>2sg</td>
<td>at</td>
</tr>
<tr>
<td>3sg</td>
<td>are’</td>
</tr>
<tr>
<td>1pl</td>
<td>oj</td>
</tr>
<tr>
<td>2pl</td>
<td>ix</td>
</tr>
<tr>
<td>3pl</td>
<td>e’a’re’/a’re’/ke</td>
</tr>
</tbody>
</table>

Table 1.2: Pronouns in K’iche’
This concludes the background on K’iche’ morphosyntax that is relevant for the discussions in chapters 3, 4 and 5. In the next section, I briefly talk about the fieldwork methodology used to collect the data I draw on in my analyses.

1.3 Fieldwork methodology

Working on the semantics and pragmatics of natural language is not straightforward because meaning, unlike word order, for instance, is not surface-visible. It is also unlike the sounds of a language because it cannot be recorded. It, thus, has to be extracted indirectly (Matthewson, 2004).

Like most semantic/pragmatic fieldwork, the K’iche’ data in this thesis were collected through one-on-one elicitation with native speakers. One-on-one elicitation involves a semanticist\textsuperscript{10} asking linguistically naive native speakers about acceptability of utterances in particular contexts, or about whether a word or a phrase can convey a particular meaning. In my fieldwork, each elicitation session typically lasted for an hour where I employed the following two procedures: (i) asking K’iche’ speakers to judge the acceptability of K’iche’ utterances in particular contexts, and (ii) asking them to translate words or phrases from Spanish into K’iche’, and vice versa. The fieldwork was conducted over a period of 6 years in Columbus, Ohio and in Santa María Tzejá, a village in the western highlands of Guatemala. The data that I base my analysis on were collected from 4 speakers of K’iche’ (3 female, 1 male) who were all bilingual in Spanish and K’iche’. Three of these speakers reside in Santa María Tzejá and one, who is originally from the same village, lives in Columbus. The age range of the speakers was 32 – 47.

Given the nature of one-on-one elicitation, the amount of data that was collected and the number of native speakers I worked with were not enough to make statistical analyses feasible. However, I looked for judgments that are consistent across speakers and across multiple elicitation sessions with a given speaker. If there was inconsistency, I tried to find out what was not being controlled for and then controlled for those confounds until I got consistent judgments. This way, I aimed to

\textsuperscript{10}Typically, the semanticist is not a native speaker of the language in question.
ensure that the data that the analyses are based on are empirically well-grounded. In presenting the
data in the subsequent chapters of this thesis, I note the variation in judgments among the speakers
where applicable. The examples I cite from other scholarly sources are identified as such in the text.
Chapter 2

Dynamic Categorial Grammar

In this chapter, I introduce Dynamic Categorial Grammar (DyCG, Martin, 2013; Martin & Pollard, 2014; Martin, 2016), the framework in which I couch the formal analysis of the K’iche’ phenomena in this thesis. DyCG provides an interface between a higher-order logic (HOL) based dynamic semantics and a linear logic based form of categorial grammar called Linear Categorial Grammar (LCG, Smith, 2010; Pollard & Smith, 2012; Mihaliček, 2012; Mihaliček & Pollard, 2012; Pollard, 2015; Worth, 2016). DyCG builds both on the grammar architecture in LCG as well as the line of work in dynamic semantics exemplified in Muskens 1996; Beaver 2001, and de Groote 2006, and it provides a directly compositional framework that captures all the central insights of the dynamic semantics tradition (Kamp, 1981; Heim, 1982).

In the next section, I introduce LCG before I go into the details of the context model in DyCG as a background for subsequent chapters.

2.1 Linear Categorial Grammar

Linear Categorial Grammar (LCG) is a proof-theoretic grammar framework where syntactic analyses of linguistic expressions take the form of logical proofs, an idea which goes back to Lambek 1958. Similar to other categorial grammar frameworks like Abstract Categorial Grammar (de Groote, 2001a), Lambda Grammar (Muskens, 2001, 2007), and Hybrid Type-Logical Grammar (Kubota & Levine, 2013, 2016), LCG separates valence-driven combinatorics, tectogrammar (also called abstract syntax), from surface morpho-phonology, phenogrammar (also called concrete syntax), an idea due to Curry (1961) and developed in Dowty 1982, Oehrle 1994, and Dowty 1996.
Tectogrammar drives the semantic composition in the analysis (or the derivation) of a sentence. Phenogrammar, on the other hand, is an explicit phonological component which deals with concrete string formation, including word order and prosody. Consequently, what is captured through the directionality and/or the multimodality of the tectogrammar in other categorial grammar frameworks (e.g., Morrill, 1994; Moortgat, 1997; Steedman, 2010; Baldridge, 2002) is captured exclusively in the phenogrammar in LCG.

LCG uses three different formal theories to model the phonology, syntax, and semantics of linguistic expressions. As I discuss in detail below, the respective higher-order theories used in the phenogrammar and the semantics are different as they use different nonlogical basic types and nonlogical constants. However, they share the same logical type (the type of formulas) and the constants *, the inhabitant of the unit type T, and = provided by HOL. The tectogrammar uses the implicative fragment of linear logic, which can be thought of as a recasting of Lambek’s (1958) syntactic calculus except for the fact that there is a single, non-directional implication (→) instead of the directional slashes \ and /.

### 2.1.1 Notational conventions

I adhere to the following notational conventions. A term a of type A is written as a : A. Lambda-bound variables are subscripted, e.g., I write \( \lambda_x. a \) instead of \( \lambda x. a \). In principle, lambda-bound variables are given with their types, e.g., I write \( \lambda_{x:e} \ldots \), but the type annotations are usually omitted when they can be inferred from context. I sometimes use a single \( \hat{\lambda} \) for multiple abstractions, e.g., \( \lambda_{xy}. a \) instead of \( \lambda x. \lambda y. a \). A similar convention is used for quantifiers in that, for example, if

---

1I use the term *logical* types/constants for those types/constants that are provided by the underlying logic as opposed to *non-logical* types/constants when they are not. For example, the type \( \text{\( \Pi \)} \) of formulas is a logical type as it is provided by HOL whereas the type \( s \) of strings in phenogrammar, and the types \( e \) of entities, \( p \) of propositions, and \( w \) of worlds in semantics are all non-logical types. As for the unit type \( T \), it is the type that can have only one inhabitant.

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16
Q: (A → B) → B and λx:A.P : A → B, I write Qx:A.P, or just Qx.P instead of Q λx:A.P. Thus, for example, ∃ λx.φ is abbreviated as ∃x.φ where ∃ binds the free variable in the formula φ.

Implication associates to the right, so A → B → C abbreviates A → (B → C), and similarly for the linear implication → used in tectogrammar. Object-language application is left-associative, so (f a b) abbreviates ((f a) b). I often eliminate outermost parentheses, so f a b abbreviates (f a b), and f (a b) abbreviates (f (a b)).

Finally, for any m-tuple x and n-tuple y, I write x, y for the (m + n)-tuple with x as its first m components and y as its last n components.

2.1.2 LCG signs

In LCG, linguistic categories are conceived of as logical formulas and linguistic expressions, or signs in Saussurean terms, as proof of those formulas. The underlying proof system is the Gentzen sequent-style natural deduction, or ND for short. ND is based on the provability relation between what is called a context and a formula. A context is a multiset of formulas which means that the repetitions, but not the order, of formulas in it matter. In other words, there is no analog of the structural rules of weakening and contraction. As such, contexts of LCG signs are resource sensitive, which reflects the resource-sensitivity of natural language syntactic combinatorics.

In ND, an ordered pair ⟨Γ, A⟩ of a context and a formula is called a sequent. Γ is referred to as the context of the sequent and A as the statement of the sequent. The formula occurrences in the context of a sequent are called assumptions or hypotheses. Since Γ is a finite multiset of formulas, it may consist of one assumption, two assumptions or even no assumptions at all. A, on the other hand, is a metavariable over formulas. Therefore, it is always instantiated by a single formula. What the proof theory does is to recursively define the provability relation between contexts and formulas. The provability relation is denoted by the symbol ⊢ which is referred to as turnstile. The metalanguage assertion ⟨Γ, A⟩ ∈ ⊢ is usually written as Γ ⊢ A, which can be read as “Γ proves A.” Intuitively, Γ ⊢ A conveys the fact that from the assumptions given in Γ, one can prove A.
Seen as a proof system, an LCG grammar recursively generates tripartite signs. Such signs correspond to the statements of sequents which have the general form in (11).

(11) \[ \Gamma \vdash a : A ; B ; c : C \]

A sign models the phonological form, syntactic category, and meaning of a linguistic expression and it is, therefore, a multidimensional construct. In the general form of a sign in (11), \( a : A \) characterizes the expression’s contribution to phonological form, \( B \) is a logical formula which describes the expression’s syntactic combinatory potential, and \( c : C \) characterizes the expression’s meaning. These three components of a sign, which are separated from each other by a ‘;’, are referred to as the *phenogrammatical* (pheno for short), *tectogrammatical* (tecto for short) and *semantic* component (semantics for short). When the types of the terms can be inferred from the terms themselves, they are usually omitted and signs of the form in (11) are written as in (12).

(12) \[ \Gamma \vdash a ; B ; c \]

In (13) below, I provide two example signs in LCG. For reasons of space, I omit the types in the pheno and the semantic components when they can be inferred from the types of the constants. However, I explain these types in the text.

(13) a. \( \vdash \text{student} ; \text{N} ; \text{student} \)

b. \( \vdash \text{john} ; \text{NP} ; \text{john} \)

Observe that the context in the signs in (13) are null. This indicates that, from a logical point of view, they are (non-logical) axioms. Intuitively, this means that in the lexicon, it is declared that the expression *student* sounds like ‘student’, has the syntactic category N, and means student. Likewise, the expression *John* sounds like ‘john’, has the syntactic category NP, and means john.\(^2\)

\(^2\)As string constants are written with standard orthography rather than phonemic notation, I’m using single quotes around pheno terms to distinguish them from ordinary text.
To lay out the details about linguistic signs in LCG and, in particular, the underlying logics that are used in each component of a sign, I turn to a discussion of the phenogrammatical, tectogrammatical and semantic components.

2.1.3 Phenogrammar in LCG

As mentioned above, phenogrammar deals with concrete string formation, including word order and prosody. A basic nonlogical type in the pheno component is s, which stands for the type of a string. For example, in the pheno of (13a) above, student : s, and in (13b), john : s. A pheno type can also be a (possibly higher-order) function over strings with a type formed via the type constructor \( \rightarrow \). For example, in (14a) below, \( s : s \) and, therefore, the pheno type of the sign for \( slept \) is \( s \rightarrow s \). Note that the variable \( s \) in (14a) occurs to the left of the verb in the pheno which encodes a fact about word order: the subject precedes the verb. In (14b), \( s : s \) and \( f : s \rightarrow s \), and so the pheno type of the sign for \( a \) is \( s \rightarrow (s \rightarrow s) \rightarrow s \).

(14) a. \( \vdash \lambda_s. s \cdot slept \); NP \( \rightarrow \) S ; sleep

b. \( \vdash \lambda_{sf}. f (a \cdot s) \); N \( \rightarrow \) (NP \( \rightarrow \) S) \( \rightarrow \) S ; a

Strings are concatenated via the associative concatenation operator, \( \cdot : s \rightarrow s \rightarrow s \) (written infix) with two-sided identity \( e : s \) (null string). Concatenation takes two strings to a third string and is subject to the axioms given in (15). With these axioms, the set of strings together with the concatenation operator forms a monoid.

(15) a. \( \vdash \forall_{sS} \forall_{tS} \forall_{uS}. (s \cdot t) \cdot u = s \cdot (t \cdot u) \) (associativity)

b. \( \vdash \forall_{sS}. (s \cdot e) = s \) (identity)

c. \( \vdash \forall_{eS}. (e \cdot s) = s \) (identity)

Although in this chapter I only consider the type s as a pheno type, it is not the only type that is used in phenogrammar. In particular, there are two basic types, namely type p for prosodic words and type c for clitics. In chapter 4, these latter types will be employed in the analysis of the negation
clitic = t(aj) ‘NEG’ in K’iche’ and I leave it for chapter 4 to define cliticization and additional string-manipulation functions needed for this analysis.

2.1.4 Tectogrammar in LCG

Tectogrammar is the locus of the combinatorial properties of a linguistic expression. A type in the tecto component of an expression, a tectotype, is a formula in linear logic and can be thought of as the syntactic category of the expression. For example, the tectotypes N, NP and S, which are types of a noun, noun phrase and a sentence, respectively, are all atomic formulas. In (13) above, (13a) has the tectotype N and (13b) has the tectotype NP. Complex tectotypes are derived using the basic types and the sole connective in linear logic, namely linear implication, which is symbolized as $\rightarrow$. Readers who are familiar with Lambek 1958 or Steedman 2010 can think of $\rightarrow$ as replacing the directional slashes \ and /. This is possible in LCG because directionality of combination is handled exclusively in the phenogrammar.

As I discuss in §2.2, since the combinatory potential of an expression is encoded in its tecto, LCG has fewer rules than a context-free grammar. As for the tecto types of linguistic expressions, once the basic tectotypes are set, e.g., as N, NP, and S, etc., the following recursion clauses generate the tectotypes.

(16) a. Any basic tectotype is a tectotype.

b. If $A$ and $B$ are basic tectotypes, then so is $A \rightarrow B$.

c. Nothing else is a tectotype.

A formula of the form $A \rightarrow B$ stands for a syntactic category that requires an $A$ to produce a $B$. For example, if we take $A$ to be NP and $B$ to be S, we obtain NP $\rightarrow$ S, a functional type which yields an S when supplied with an NP. This complex type is the tectotype of the intransitive verb in (14a). As for (14b), its tectotype requires it to combine with an expression of type N followed by an expression of type NP $\rightarrow$ S to yield an expression of type S. Below, for reasons of space, I abbreviate
the tectotype N $\rightarrow$ (NP $\rightarrow$ S) $\rightarrow$ S of (14b) as Det (determiner), and the tectotype (NP $\rightarrow$ S) $\rightarrow$ S as QP (quantificational NP).

### 2.1.5 Semantic component in LCG

The static semantic theory used in LCG is a possible world semantics called Agnostic Hyperintensional Semantics (AHS, Pollard, 2008; Plummer & Pollard, 2012; Pollard, 2015). AHS is like Montague semantics (MS) but it makes finer meaning distinctions by not identifying senses with intensions, i.e., functions from worlds to extensions. In particular, it is agnostic in the sense that it is indifferent as to whether propositions are defined as sets of worlds, or in some other way. Rather, AHS treats propositions as having a basic type of their own, namely p, as in Thomason 1980; Muskens 2005, and Pollard 2008. Given its agnosticism, the main distinction between AHS and MS is that AHS does not require the sense of a declarative sentence, i.e., a proposition, be a function from worlds to truth values. Consequently, mutually entailing propositions do not end up being identical. This is the way in which AHS offers a way to avoid some of the foundational problems of MS, e.g., the granularity problem. AHS is, in fact, a logically weaker theory than MS and by adding one axiom, namely, the one that identifies propositions as sets of worlds, one could turn it into MS. Despite being logically weaker, however, AHS is strong enough to write a theory of grammar in, as neither how a proposition is modeled nor its truth at a given world is central to the analysis of linguistic meaning.

AHS is written in HOL together with the nonlogical types e for entities, p for (static) propositions, and w for worlds. Complex types are derived from the basic types via the type constructor $\rightarrow$. For example, the semantic types of the signs in (13a) and (13b) are e $\rightarrow$ p and e, respectively. The semantic type of (14a) is e $\rightarrow$ p and that of (14b) is (e $\rightarrow$ p) $\rightarrow$ (e $\rightarrow$ p) $\rightarrow$ p. In addition to the nonlogical types, there are the logical types t for truth values and the unit type T provided by the underlying logic. In general, the set of semantic types are recursively defined as in (17).

\[(17)\quad a.\text{ The types } T, e, p, t \text{ and } w \text{ are semantic types.}\]
b. If $A$ and $B$ are semantic types, then so is $A \rightarrow B$.

c. Nothing else is a semantic type.

In (18), I also define the types of $n$-ary static properties for future reference. Given (18), we write $\text{rain} : p_0 (= p)$, $\text{student} : p_1 (= e \rightarrow p)$, $\text{help} : p_2 (= e \rightarrow e \rightarrow p)$, etc.

\begin{align*}
(18) & \quad a. \quad p_0 =_{\text{def}} p \\
& \quad b. \quad p_{n+1} =_{\text{def}} e \rightarrow p_n
\end{align*}

In the next section, I discuss static meanings and their extensions in AHS.

**Static meanings and their extensions**

In AHS, not all semantic types are types of meanings of linguistic expressions, e.g., $w$ or $t$. The semantic types which can be the types of meanings of linguistic expressions are called *sense types*. These are the types $T$, $e$, $p$, and functional types formed from these via the type constructor $\rightarrow$. The unit type $T$ and its associated logical constant $*$ is used as the sense of semantically vacuous linguistic expressions, e.g., the pleonastic *it* in *It's raining*.

Each sense type $A$ has a corresponding *extension* type, $\text{Ext} (A)$, defined as in (19).

\begin{align*}
(19) & \quad a. \quad \text{Ext} (T) = T \\
& \quad b. \quad \text{Ext} (e) = e \\
& \quad c. \quad \text{Ext} (p) = t \\
& \quad d. \quad \text{Ext} (A \rightarrow B) = A \rightarrow \text{Ext} (B)
\end{align*}

Using the extension types in (19), I introduce, for each sense type $A$, the *extension function for $A$*, $\@_A : A \rightarrow w \rightarrow \text{Ext} (A)$, which is subject to the axioms below (the subscript on $\@$ is omitted when it can be inferred from context). First, following Kripke (1980), every entity is its own extension at every world. This is captured in (20).

\begin{align*}
(20) & \quad \vdash \forall x.e. \forall w.w. x \@ w = x
\end{align*}
Second, for any proposition $p$, $p@w$ is called the truth value of $p$ at $w$. For a sense type which is a functional type of the form $A \rightarrow B$, the corresponding axiom is the one given in (21).

\begin{equation}
\vdash \forall f:A \rightarrow B. \forall w:w. f@w = \lambda x:e. (f\ x)@w
\end{equation}

For example, if $A$ and $B$ are instantiated as $e$ and $p$, respectively, we obtain (22).

\begin{equation}
\vdash \forall P:e \rightarrow p. \forall w:w. P@w = \lambda x:e. (P\ x)@w
\end{equation}

Thus, for a given world $w_0$, the extension at $w_0$ of a given property, say, student would correspond to $\lambda x.(\text{student}\ x)@w_0$, namely all entities $x$ such that the proposition that $x$ is a student is true at $w_0$.

In the next section, I turn to a discussion of the notions of equivalence, entailment, and equality in AHS.

**Equivalence, entailment, and equality**

In this section, I introduce a handful of relations between senses, building on the definition of the extension function $@_A$ from the previous section. First, I define the equivalence relation $\equiv:A \rightarrow A \rightarrow t$ between two senses which is subject to the axiom in (23): two senses $a$ and $b$ of type $A$ are equivalent if they have the same extension at every world.

\begin{equation}
\vdash \forall a:A. \forall b:A. (a \equiv b) \leftrightarrow \forall w:w. ((a@w) = (b@w))
\end{equation}

Next, I define propositional entailment encoded in the constant $\text{entails}: p \rightarrow p \rightarrow t$, as in (24): a proposition $p$ entails a proposition $q$ if at every world $w$ where $p$ is true, so is $q$.

\begin{equation}
\text{entails} =_{\text{def}} \lambda p:p. \lambda q:p. \forall w:w. (p@w) \rightarrow (q@w)
\end{equation}

From (23) and (24), we get (25): two mutually-entailing propositions are propositionally equivalent. Note that since entailment is not subset inclusion over sets of worlds, mutual entailment of two propositions does mean that they are equal.

23
Finally, I introduce the (hyper-intensional) equality function, equals_A : A → A → p, which is subject to the axiom in (26): two terms of some sense type A are hyper-intensionally equal at a world w, if and only if they are equal.

(26) ⊢ ∀a:A.∀b:A.∀w:w.(a equals_A b) @ w ↔ a = b

Static semantic constants

In AHS, alongside the truth-value connectives and quantifiers of the underlying HOL, namely, T, F, ∧, ∨, →, ↔, ¬, ∃, ∀, there are also propositional connectives true, false, and, or, implies, and not as well as the propositional quantifiers exists_A and forall_A, where A is a sense type. For example, the quantificational determiners a and every are defined as in (27).

(27) a. a =_def λPQ.exists_x.(P x) and (Q x)
    b. every =_def λPQ.forall_x.(P x) and (Q x)

The propositional connectives not and and, and the propositional quantifiers exists_A and forall_A are subject to the following axioms.\(^3\)

(28) a. ⊢ ∀p:p.∀w:w. (not p) @ w ↔ ¬(p @ w)
    b. ⊢ ∀p:p.∀q:q.∀w:w.((p and q) @ w) ↔ ((p @ w) ∧ (q @ w))
    c. ⊢ ∀p:A→p.∀w:w.((forall P) @ w) ↔ ∀x:A.((P x) @ w)
    d. ⊢ ∀p:A→p.∀w:w.((exists P) @ w) ↔ ∃x:A.((P x) @ w)

Having discussed the three components of a linguistic sign in LCG the corresponding logics for each component, and the details of AHS, I turn to a discussion of the inference rules used in LCG.

---

\(^3\)Here, I am only including the axioms that are relevant for the expressions that I make use of in the analyses. For a complete list of the connectives and quantifiers, and their corresponding axioms, see Martin 2013.
2.2 Inference rules in LCG

LCG has two inference rules that are used in the analysis of linguistic expressions. The first rule is the rule of Modus Ponens (MP), also known as implication elimination. The second rule is the rule of Hypothetical Proof (HP), also known as implication introduction. In the next two sections, I introduce these rules and illustrate their use with examples.

2.2.1 Modus Ponens

An inference rule like Modus Ponens (MP), given in (29), is a conditional statement where the sequents above the inference line (labeled MP) are premisses and the sequent below the inference line is the conclusion. \( \Gamma \) and \( \Delta \) are metavariables ranging over contexts. In the context of the conclusion, \( \Gamma \) and \( \Delta \) are separated by a ‘;’ which represents multiset union. Modus ponens is \( \rightarrow \)-elimination in the tecto; in the pheno and semantics, it is \( \rightarrow \)-elimination at the level of types and function application at the level of terms.

(29) Modus Ponens (MP)

\[
\Gamma \vdash f : A \rightarrow D ; B \rightarrow E ; g : C \rightarrow F \quad \Delta \vdash a : A ; B ; c : C \\
\Gamma, \Delta \vdash f a : D ; E ; g c : F \quad \text{MP}
\]

Intuitively, what the rule of MP says is that a linguistic sign with a syntactic category \( B \rightarrow E \) combines with a linguistic sign of category \( B \) to produce a linguistic sign of category \( E \). The semantics mirrors this effect via function application: the meaning of the conclusion, \( g c \), is obtained by applying the meaning of the major premise/funcr, \( g \), to the meaning of the minor premise/argument, \( c \). In the phenogrammar, the pheno of the major premise/funcr applies to the pheno of the minor premise/argument to yield \( f a \). In general, since the type of a term can be inferred from the term itself, the rule above can be simplified as in (30) where the pheno and sense types are omitted.

(30) Modus Ponens (simplified)

\[
\Gamma \vdash f : B \rightarrow E ; g \quad \Delta \vdash a ; B ; c \\
\Gamma, \Delta \vdash f a ; E ; g c \quad \text{MP}
\]
To illustrate the use of modus ponens, consider the derivation of the sentence in (31) given in (33). In this derivation, I use the two lexical entries in (32), which were defined previously.

(31) John slept.

(32) a. ⊢ λ_s. s · slept ; NP → S ; sleep 
    b. ⊢ john ; NP ; john

In (33), the pheno terms λ_s. s · slept and john combine to yield john · slept via function application, after λ-conversion. The tecto type NP → S of the verb slept requires it to combine with an expression of type NP to yield an expression of type S. In the semantics, the property sleep of type e → p combines with john of type e to yield sleep john of type p.

(33) ⊢ λ_s.s · slept ; NP → S ; sleep ⊢ john ; NP ; john ⊢ john · slept ; S ; sleep john

The LCG analysis tree in (33) is a particular instance of what is called a proof tree whose root and leaves are labeled with sequents corresponding to linguistic expressions. More precisely, a proof tree is an ordered tree whose nodes are labeled by sequents such that (i) the label of each leaf node is an axiom, and (ii) the label of each non-leaf node is the conclusion of a rule such that the premisses of the rule are the labels of the node’s daughters. Instead of edges connecting mothers to daughters, we write a horizontal line where we put the sequents corresponding to the daughters above the line and the sequent corresponding to the mother below the line.

To take another example, consider the derivation of the sentence in (34) given in (36). The lexical entries used in (36) are given in (35). Note that in (35a) the pleonastic It is modeled to have the empty semantics * , which is the only inhabitant of the unit type T (Carpenter, 1997). The semantics of the weather predicate rain is then modeled as taking the empty semantics as its sole argument to yield a proposition, namely rain. In the tecto of (35a), the basic type It is used. Correspondingly, the tecto of (35b) is modeled to take an expression of type It as argument.

4Thus, from a logician’s point of view, linguist’s trees are upside down.
Employing this type in the tecto, instead of NP, and employing \( \ast : T \) in the semantics ensures that \textit{rained} can only combine with the pleonastic \textit{It}.

(34) \textit{It rained.}

(35) a. \( \vdash \text{it} \); \( \text{It}; \ast : T \)

b. \( \vdash \lambda_s. s \cdot \text{rained} \); \( \text{It} \circ S \); \( \lambda_u. \text{rain} : T \rightarrow p \)

Given the lexical entries in (34), the derivation of (35) is as in (36). The pheno term \( \lambda_s. s \cdot \text{rained} \) applies to the pheno term ‘it’ to yield ‘it \cdot \text{rained}’. In the tecto, \( \text{It} \circ S \) applies to \text{It} to yield an \( S \). Finally, in the semantics \( \lambda_u. \text{rain} \) applies to \( \ast \) to yield \( (\text{rain} \ast) \) which reduces to rain.

(36) \[
\begin{array}{c}
\vdash \lambda_s. s \cdot \text{rained} \; \text{It} \circ S \; \lambda_u. \text{rain} \\
\vdash \text{it} \; \text{It}; \ast \\
\hline
\vdash \text{it} \cdot \text{rained} \; S \; \text{rain} \quad \text{MP}
\end{array}
\]

A third example, which uses the rule of modus ponens twice, is given in (39), the derivation of the sentence in (37). In this derivation, I use the lexical entries for \( a \), \textit{student}, and \textit{slept}, which were defined previously. The definition of the quantificational determiner sense \( a \) is repeated in (38d).

(37) \textit{A student slept.}

(38) a. \( \vdash \text{student} \); \( N \); \( \text{student} \)

b. \( \vdash \lambda_s. s \cdot \text{slept} \); \( \text{NP} \circ S \); \( \text{sleep} \)

c. \( \vdash \lambda_{sf}. f (a \cdot s) \); \( N \circ (\text{NP} \circ S) \circ S \); \( a \)

d. \( a =_{\text{def}} \lambda_{PQ}. \exists_x (P \cdot x) \) and \( (Q \cdot x) \)

In (39), I stack up the lexical entries for ease of readability. In the first instance of MP, \( a \) of type Det combines with \textit{student} of type N to yield an expression of type QP. The pheno of \( a \) applies to the pheno of \textit{student} to create the functional term \( \lambda_{sf}. f (a \cdot \text{student}) \). In the semantics, \( a \) of type \( (e \rightarrow p) \rightarrow (e \rightarrow p) \rightarrow p \) combines with \textit{student} of type \( e \rightarrow p \) to yield \textit{a student} of type \( (e \rightarrow p) \rightarrow p \). In the second instance of MP, \( a \) \textit{student} of type QP takes \textit{slept} of type \( \text{NP} \circ S \) as argument to yield an expression of type \( S \). In the pheno, \( \lambda_{sf}. f (a \cdot \text{student}) \) applies to \( \lambda_u. s \cdot \text{slept} \) to yield \( a \cdot \text{student} \cdot \text{slept} \).
In the semantics, a student of type \((e \rightarrow p) \rightarrow p\) applies to sleep of type \(e \rightarrow p\) to yield a student sleep of type \(p\).

\[
\begin{align*}
\vdash \lambda_{e \rightarrow p} f \ (a \cdot s) ; \quad & \vdash \text{student} ; \\
\qquad \text{Det} ; \quad & \vdash \text{N} ; \\
\quad \frac{a \cdot \text{student}}{\vdash \lambda_{e \rightarrow p} f \ (a \cdot \text{student}) ;} \quad & \text{MP} \\
\quad \frac{\vdash \lambda_{e \rightarrow p}. f \ (a \cdot \text{student}) ; \quad \vdash \lambda_{e \rightarrow p} s \cdot \text{slept} ;} {\vdash \lambda_{e \rightarrow p} s \cdot \text{slept} ;} \\
\quad \frac{\vdash \lambda_{e \rightarrow p} s \cdot \text{slept} ;} {\vdash \lambda_{e \rightarrow p} s \cdot \text{slept} ;} \\
\quad \frac{a \cdot \text{student}}{\vdash a \cdot \text{student} \cdot \text{slept} ; S ; a \cdot \text{student} \cdot \text{slept} ;} \quad & \text{MP}
\end{align*}
\]

Given the definition in (38d), the semantic term in the root label of (39) reduces to (40a). From (40a) and the axioms in (28), one can deduce the correct truth conditions for (37) at any world \(w\) to be as in (40b).

\[
\begin{align*}
(40) \quad & a. \vdash \exists x. (\text{student } x) \land (\text{sleep } x) \\
& b. \vdash \exists x. ((\text{student } x) @ w) \land ((\text{sleep } x) @ w)
\end{align*}
\]

Having illustrated how the rule of MP works, I turn to the second rule used in LCG, namely hypothetical proof.

2.2.2 Hypothetical Proof

Besides lexical entries, which are as non-logical axioms, the proof system employs logical axioms with the general schema given in (41). Logical axioms correspond to traces in mainstream generative grammar and to Montague’s (1973) syntactic variables. In particular, a trace is a hypothetical sign with variables for pheno and semantics. These variables remain free in the derivation until they get bound by an application of the rule of hypothetical proof (HP), which I introduce shortly.

\[
\begin{align*}
(41) \quad & p : P ; A ; z : B \vdash p : P ; A ; z : B
\end{align*}
\]

In the above schema, \(p\) can be instantiated as any pheno type, \(A\) as any tecto type, and \(B\) as any sense type. For example, an NP trace is given in (42). Here, \(t\) is a variable of type \(s\) which denotes a hypothetical string; NP is a basic tecto type, and \(x\) is a variable of type \(e\) which denotes a hypothetical individual.
Before illustrating how traces are used in derivations, I introduce the second rule of the proof system, namely Hypothetical Proof (HP), whose use is connected to that of traces. HP is $\rightarrow\phi$-introduction in the tecto; in the pheno and semantics, it is $\rightarrow$-introduction at the level of types, and function abstraction at the level of terms. HP is the categorial analog of $wh$-movement, relativization, QR, etc., in mainstream generative grammar since it allows to discharge a hypothetical sign, which is similar to binding a trace with an operator.

\[
\Gamma, p : P ; A ; z : B \vdash a : C ; D ; b : E \\
\Gamma \vdash \lambda_p a : P \rightarrow C ; A \rightarrow D ; \lambda_z b : B \rightarrow E \quad \text{HP}
\]

Intuitively, what this rule is saying is that if we can prove a linguistic expression of category $D$ when we assume $\Gamma$ and an expression of category $A$, then we are allowed to conclude that the original set of assumptions without the expression of category $A$, i.e., $\Gamma$ by itself, proves a linguistic expression with category $A \rightarrow \phi D$. This is so because if we were to put $\Gamma$ and $A$ together, we would get $D$ again. In the pheno and semantics, this effect is mirrored by function abstraction.

\[
\Gamma, p : P ; A ; z \vdash a ; D ; b \\
\Gamma \vdash \lambda_p a ; A \rightarrow D ; \lambda_z b \quad \text{HP}
\]

Having introduced traces and hypothetical proof, I illustrate their use in the proof of the sentence in (45). In this proof, I use the lexical entries in (46), which were defined previously except for (46d).

(45) John helped a student.

(46)  
\begin{align*}
a. & \vdash \text{student} ; \text{N} ; \text{student} \\
b. & \vdash \text{john} ; \text{NP} ; \text{john} \\
c. & \vdash \lambda_{sf} f (a \cdot s) ; \text{N} \rightarrow (\text{NP} \rightarrow \phi \text{S}) \rightarrow \phi \text{S} ; a \\
d. & \vdash \lambda_{st} t \cdot \text{helped} \cdot s ; \text{NP} \rightarrow \phi \text{NP} \rightarrow \phi \text{S} ; \text{help}
\end{align*}
For reasons of space, I divide the proof of (45) into three parts. In (47) below, the quantificational
determiner $a$ combines with the noun $student$ via modus ponens to create the expression $a \ student$.

\[
\mathcal{P} \vdash \lambda f.f \ (a \cdot s) ; \ Det \ ; a \quad \mathcal{P} \vdash \text{student} ; \ N \ ; \ \text{student} \\
\mathcal{P} \vdash \lambda_f.f \ (a \cdot \text{student}) ; \ QP \ ; a \ \text{student} \quad \text{MP}
\]

In (48), the transitive verb $\text{helped}$ first combines with an NP trace in the object position and
then with its subject $\text{John}$ both via modus ponens. Next, at the step labeled HP, the hypothesis is
discharged and we obtain a sentence with an object ‘gap’ in it. Note that the type $\text{NP} \rightarrow \text{S}$ of the
resulting expression only encodes the information that it is missing an NP but does not indicate the
relative position of this missing argument. This latter information is encoded in the phenogrammar,
specifically, via the variable $s$ corresponding to the pheno of the missing argument which follows
the verb in the linear order.

\[
\mathcal{P} \vdash \lambda_{st}.t \cdot \text{helped} \cdot s ; \quad s ; \ \text{NP} ; x \vdash s ; \\
\text{NP} \rightarrow \text{NP} \rightarrow \text{S} ; \quad \text{NP} ; \\
\text{help} ; \quad x \quad \text{MP} \\
\mathcal{P} ; x \vdash \lambda_x.t \cdot \text{helped} \cdot s ; \\
\text{NP} \rightarrow \text{S} ; \quad \text{NP} ; \\
\text{help} x \quad \text{john} \quad \text{MP} \\
\mathcal{P} ; x \vdash \lambda_x.\text{john} \cdot \text{helped} \cdot s ; \\
\text{NP} \rightarrow \text{S} ; \quad \lambda_x.\text{help} x \ \text{john} \quad \text{HP}
\]

The final step of the derivation is given in (49). Here, the steps (47) and (48) are combined via
modus ponens and $a \ \text{student}$ is ‘lowered’ into the object position. This analysis, proposed in Oehrle
1994, is analogous to Montague’s (1973) quantifier lowering.

\[
\mathcal{P} \vdash \lambda_x.\text{john} \cdot \text{helped} \cdot a \cdot \text{student} ; \ S ; \ a \ \text{student} (\lambda_x.\text{help} x \ \text{john}) \quad \text{MP}
\]

Given the definition in (46c), the semantic term in the root label of (49) reduces to (50). Similar
to (37), the truth conditions for (45) can then be deduced from the axioms in (28).

\[
\mathcal{P} \vdash \exists x. \ (\text{student} \ x) \ and \ (\text{help} \ x \ \text{john})
\]

Having laid out the LCG framework, I turn to a discussion of Dynamic Categorial Grammar.
2.3 Dynamic Categorial Grammar

Dynamic Categorial Grammar (DyCG, Martin, 2013; Martin & Pollard, 2014; Martin, 2016) is a fully compositional, dynamic framework for discourse analysis which captures the basic insights of the dynamic semantics tradition (Kamp, 1981; Heim, 1982).

DyCG builds on the line of work in dynamic semantics (e.g., Muskens, 1996; Beaver, 2001; de Groote, 2006) which uses HOL to express the semantics. The underlying semantic theory used in DyCG is written in HOL with the addition of the basic (non-logical) types e for entities, p for propositions and w for worlds which I introduced previously. From these basic types, complex types that can be meanings of linguistic expressions are obtained by the type constructor \( ightarrow \), e.g., \( e \rightarrow p \) and \( e \rightarrow e \rightarrow p \) for unary and binary (static) properties, respectively. The dynamic semantics will be a straightforward extension of the static semantics of LCG, as I elaborate on in due course.

In the next section, I discuss how discourse contexts are modeled in DyCG.

2.3.1 Contexts in DyCG

DyCG follows the dynamic semantics tradition (e.g., Kamp, 1981; Heim, 1982) in treating the meaning of utterances of declarative sentences as functions from contexts to contexts. In other words, utterances are not interpreted in isolation but rather their interpretations (i) depend on the context, and (ii) change the context.

In DyCG, contexts are modeled as functions from \( n \)-tuples of entities to propositions.\(^5\) Such a function, which is called an \( n \)-ary context, has the type \( c_n \) defined in (51).

\[
(51) \quad c_n = \text{def} \ e^n \rightarrow p
\]

In (51), \( n \) is called the \textit{arity} of the context. Intuitively, the \( n \) components of the tuple correspond to the \( n \) discourse referents (DRs) that the context “knows about.” Note that an \( n \)-ary context would yield a proposition when applied to an \( n \)-tuple of entities if the interlocutors had their hands on the

\(^5\)Tuples of entities are the counterpart of assignments in file change semantics (Heim, 1982).
identities of the DRs that the discourse is about. This, however, is not the case in general. Rather, what is known about the DRs is what the common ground (CG) says about them.

Before going into the technical details about the framework, I illustrate how context update in DyCG looks with a simple example. To that end, consider the dynamic meaning, also called content, of the sentence *A cat chased a mouse* given in (52). This content takes a context $c$ whose DRs are notated as $x^{|c|}$, where $|c|$ is the arity of $c$, and it adds two new DRs to it which are notated as $y^2$. Vector notation is used when referring to tuples of DRs, e.g., $x : e^n$ is an $n$-tuple of entities and the $i$-th component of $x$, written $x_i$, corresponds to the $i$-th DR. As shorthand, I sometimes use $x^n$ to indicate that $x$ is of type $e^n$.

$$(52) \quad \lambda c. \lambda x^{|c|} y^2. \text{(cat } y_0 \text{) and (mouse } y_1 \text{) and (chase } y_1 y_0 \text{)}$$

The acceptance of the content (52) results in the associated update function given in (53) being applied to the current context. Here, the first conjunct is the carryover from whatever will be the input context, and the rest arises from the content itself. The update function in (53) is obtained by applying the context change function $cc$ described in §2.3.2 to the content in (52).

$$(53) \quad \lambda c. \lambda x^{|c|} y^2. (c x) \text{ and (cat } y_0 \text{) and (mouse } y_1 \text{) and (chase } y_1 y_0 \text{)}$$

If the input context is out-of-the-blue, the update in (53) would yield the 2-ary context in (54).

$$(54) \quad \lambda x^2. \text{(cat } x_0 \text{) and (mouse } x_1 \text{) and (chase } x_1 x_0 \text{)}$$

Observe that the type $c$ of contexts used in (52) and (53) is the type of contexts of any arity. Therefore, it should subsume all the $n$-ary contexts for every natural number $n$. It is defined by using a dependent sum type as in (55) where $\Sigma$ is the dependent sum operator. This type denotes a disjoint union of a family of sets which is itself indexed by the members of another set (here, the natural numbers). Another way to think about dependent sums is as a generalization of binary cartesian products such that the dependent sum type in (55) denotes a set of ordered pairs where the first component of the ordered pair is a natural number $n$ and the second component is a member of the functions of type $e^n \rightarrow p$.

$$(55) \quad \Sigma n : \text{nat}. e^n$$
When we are dealing with anaphora, we want to make sure that a context has a certain number of DRs. In other words, we want to make sure that the arity of a context is greater than some number \( n \) for the felicitous use of the sentence with the anaphoric trigger in that context. This allows us to make anaphoric reference to the \( n \)-th DR which will only be interpretable in a context whose arity is greater than \( n \). To this end, the type of contexts of arity at least \( n \) is defined as in (56a) and the type contexts of arity strictly greater than \( n \) is defined as in (56b). We will make use of these types when we discuss how definiteness is handled in DyCG in §2.3.5.

\[
\begin{align*}
(56) \quad a. \quad c_{\geq n} & \overset{\text{def}}{=} \sum_{m \geq n} c_{n+m} \\
[1ex] 
\quad b. \quad c_n & \overset{\text{def}}{=} c_{n+1}
\end{align*}
\]

In the next section, I discuss contents, namely the dynamic meanings of declarative sentences, e.g., (52), and their updates, e.g., (53), in more detail.

### 2.3.2 Contents and Updates

When an utterance is accepted in discourse, its update carries over the CG of the input context and conjoins to it the new content that the utterance itself contributes. To capture this insight common to dynamic approaches, DyCG distinguishes between contents, namely the dynamic meanings of declarative sentences, and updates, which correspond to proposals to change the context by adding the content of the declarative sentence.

If a content \( k \) is accepted by the interlocutors, its update is obtained by applying to it the function \( cc \) defined in (57).

\[
(57) \quad cc = \overset{\text{def}}{=} \lambda_{k,k}.\lambda_{c,c}.\lambda_{x,c}.\lambda_{y,\text{arity}(c)+|k|}. (c \ x) \text{ and } (k \ c \ x, y)
\]

The \( cc \) function takes as argument a content \( k \) of degree \( |k| \), where degree of \( k \) is the number of DRs that \( k \) introduces, and a context \( c \) of arity \( |c| \). Then, it returns a new context of arity \( |c|+|k| \) whose CG is obtained by conjoining the carryover from the input context \( c \) with the conjunct which
is jointly determined by $c$ and the proffered content $k$. Thus, $cc$ promotes a content $k$ to an update $cc\,k$. This update, in turn, is itself a function which converts an input context to a new context into which the content $k$ has been incorporated. For example, (53) was obtained by applying $cc$ to (52).

To take another example, consider the content of “It’s raining” given in (58) and its corresponding update given in (59). Note that since the degree of (58) is 0, i.e., since there is no new DR that is introduced by (58), the length of the vector $y$ in the definition of $cc$ will be 0, hence the update in (59). Note that I write dynamic meanings in SMALL CAPS.

(58) \[ \text{RAIN} = \lambda c : c. \lambda x |c| \cdot \text{rain} \]

(59) \[ cc\,\text{RAIN} = \lambda c : c. \lambda x |c| \cdot (c\,x) \] and \( (\text{RAIN}\,c\,x) = \lambda c : c. \lambda x |c| \cdot (c\,x) \] and \( \text{rain} \)

The type $k_n$ of a content that introduces $n$ DRs, i.e., a content of degree $n$, is defined as in (60). A content of type $k_n$ takes as input a context of arity $m$ and returns a context of arity $m + n$. Observe that the type of the output context depends on the type of the input context. To capture this dependency, we use the dependent product operator $\Pi$ in the definition of $k_n$. Dependent products are a generalization of function types that express the (possible) dependency of the type of a value on the identity of the argument.

(60) \[ k_n = \lambda c : c. \lambda m. k_{m+n} \]

Similar to the definition of $c$, the type $k$ of contents should subsume contents of any degree. Thus, $k$ is defined as in (61). Updates (of arity $n$) have the same type as contents (of arity $n$), though they play a different role in the theory.

(61) \[ k = \lambda n. k_n \]

In the next few sections, I discuss the extension of the static semantics of LCG to the dynamic semantics of DyCG.
2.3.3 From static to dynamic semantics

In dynamic semantics, the static senses of common nouns, predicative adjectives, intransitive verbs, etc., have to be replaced by their dynamic counterparts. To that end, we define the *dynamicization* function which maps a static property of some arity to its corresponding dynamic counterpart. In (62), I provide the dynamicization functions for arities 0-2 which I use in the examples.

(62) a. \( \text{dyn}_0 = \lambda p . \lambda c . \lambda x . p \)

    b. \( \text{dyn}_1 = \lambda p . \lambda m . \lambda n . \lambda x . \lambda y . (P x_n) \)

    c. \( \text{dyn}_2 = \lambda R . \lambda m . \lambda n . \lambda x . \lambda y . (\text{max} m n) \)

Based on the definitions in (62), we obtain the following dynamic meanings for the proposition `rain`, common noun `student`, and transitive verb `help`.

(63) a. \( \text{RAIN} = \text{def} \ \text{dyn}_0 \ \text{rain} = \lambda c . \lambda x . \lambda y . \text{rain} \)

    b. \( \text{STUDENT} = \text{def} \ \text{dyn}_1 \ \text{student} = \lambda m . \lambda n . \lambda x . \lambda y . \text{student} x_n \)

    c. \( \text{HELP} = \text{def} \ \text{dyn}_2 \ \text{help} = \lambda m . \lambda n . \lambda x . \lambda y . \text{help} x_m x_n \)

In the next section, I introduce the context extension function and then define dynamic counterparts of the static connectives and quantifiers I introduced previously.

2.3.4 Context extension, dynamic connectives and dynamic quantifiers

In order to define \( \text{EXISTS} \), the dynamic counterpart of `exists`, which will be used to define dynamic quantifiers like \( \text{A} \) and \( \text{FORALL} \), we first define the *context extension* function as in (64). The context extension function extends a context’s arity by one. In other words, for a context \( c \), \( c^+ \) is just like \( c \) except that its argument vector has an extra coordinate.

(64) \( (c)^+ = \text{def} \ \lambda c . \lambda x . c x \)

Using the context extension function, we define the dynamic existential \( \text{EXISTS} \) as in (65). This definition says that \( \text{EXISTS} \) takes a dynamic property \( D \) and passes to it the new DR corresponding
to $|c|$, which is the index of the newly-added DR in the context $c^+$. The way that \textsc{exists} is defined, thus, captures the \textit{novelty condition} of indefinites (Heim, 1982).

\begin{equation}
\textsc{exists} =_{df} \lambda_D. \lambda_{c^+}. D \mid c | c^+ 
\end{equation}

To illustrate how the dynamic existential quantifier \textsc{exists} works, consider the derivation of \textsc{exists student} given in (66). Note that the argument $c^+$ has the effect of constraining the arity of the input vector $x$ to be $|c^+| = |c| + 1$.

\begin{equation} \text{EXISTS STUDENT} = \lambda_c. \text{STUDENT } \mid c | c^+ 
\end{equation}

\begin{align*}
= & \lambda_c. (\lambda_{d|c^+}. \lambda_{x|d}. \text{student } x_n \mid c | c^+) \\
= & \lambda_c. (\lambda_{d|c^+}. \lambda_{x|d}. \text{student } x_{|c|} \mid c^+) \\
= & \lambda_{c^+}. \lambda_{x|c^+}. \text{student } y
\end{align*}

Next, I define the dynamic negation operator \textsc{not} in (67). In the definition of \textsc{not}, all the $|k|$ DRs of the content $k$ become existentially bound in the scope of \textsc{exists}. This is reminiscent of Heim’s (1982) existential closure. In other words, dynamic negation both negates the propositional content in its scope and limits the accessibility of any DRs introduced in its scope.

\begin{equation}
\textsc{not} =_{df} \lambda_{k^{\bot}}. \lambda_{c^+}. \lambda_{x|c^+}. \text{not exists}_{y|k}. (k \mid c, x, y)
\end{equation}

To illustrate how the dynamic negation operator \textsc{not} works, consider (68) which is the derivation of \textsc{not (exists student)}. Note that the argument of student, namely the sole component of $y^1$, is bound by \textsc{exists} and therefore not available outside of the scope of \textsc{not}.

\begin{equation} \textsc{not (exists student)} = \lambda_c. \lambda_{x|c^+}. \text{not exists}_{y|c^+}. ((\text{EXISTS STUDENT}) c \mid x, y) 
\end{equation}

\begin{align*}
= & \lambda_c. \lambda_{x|c^+}. \text{not exists}_{y|c^+}. ((\lambda_{d|c^+}. \lambda_{z|d}. \text{student } z_{|d|} \mid c | x, y) \\
= & \lambda_c. \lambda_{x|c^+}. \text{not exists}_{y|c^+}. ((\lambda_{z|c^+}. \text{student } z_{|c^+|} \mid x, y) \\
= & \lambda_{c^+}. \lambda_{x|c^+}. \text{not exists}_{y|c^+}. \text{student } (x, y)_{|c^+|} \\
= & \lambda_{c^+}. \lambda_{x|c^+}. \text{not exists}_{y|c^+}. \text{student } y_0
\end{align*}
Next, I define the dynamic conjunction \textsc{AND} as in (69). Here, note that the second conjunct \( k \) is interpreted in the context which is obtained by applying the first conjunct \( h \) to the input context \( c \), namely the context \((cc\ h\ c)\). The content \( h \), on the other hand, is only evaluated in the input context \( c \). Thus, the definition of \textsc{AND} reflects the fact that conjunction in discourse is in general asymmetric.

\begin{equation}
\text{AND} =_{\text{def}} \lambda_{k}:k.\lambda_{c:c}.\lambda_{y:y^{[4]}}. \lambda_{x:x}. (h \ c \ y) \ \text{and} \ (k \ (cc \ h \ c) \ x, y, z)
\end{equation}

To illustrate how the dynamic conjunction works, consider the example in (70). Here, the second conjunct gets evaluated in the context \((cc \ \text{RAIN} \ c)\). Note that since \(|\text{RAIN}| = |\text{SNOW}| = 0\), the vectors \( y^{[\text{RAIN}]} \) and \( z^{[\text{SNOW}]} \) are of length 0.

\begin{equation}
\text{RAIN AND SNOW} = (\text{RAIN} \ c \ x, y) \ \text{and} \ (\text{SNOW} \ (cc \ \text{RAIN} \ c) \ x, y, z)
\end{equation}

Finally, using \textsc{EXISTS} and \textsc{NOT}, we define the dynamic quantifier \textsc{FORALL} as in (71).

\begin{equation}
\text{FORALL} =_{\text{def}} \lambda_{D}.\text{NOT EXISTS}_{\text{n}}. \text{NOT} \ (D \ n)
\end{equation}

In the next section, I discuss dynamic entailment and how anaphora is handled in DyCG.

### 2.3.5 Dynamic entailment and anaphora

To be able to talk about the notion of entailment between a context and content, we first define the notion of \textit{context entailment} between two contexts as in (72). This definition says that a context \( c \) entails another context \( d \) of arity greater than or equal to that of \( c \) if for every input vector \( x \) of length
\(|c|\), the proposition \((c \mathbf{x})\) entails that there is a vector \(\mathbf{y}\) such that \(\mathbf{x}, \mathbf{y}\) is of length \(|d|\) and \((d \mathbf{x}, \mathbf{y})\).

Put simply, the first context must entail the existence of entities satisfying the content that is found in the second but not in the first.

\[(72)\quad c\text{-entails} = \text{def} \lambda_{c:c}. \lambda_{d:c|c|.} \forall \mathbf{x} |c|. \ (c \mathbf{x}) \text{ entails exists}_{y|d|} (d \mathbf{x}, \mathbf{y})\]

Next, we define the notion of \textit{content entailment} which is used to determine whether a potential update of a content would be entailed by a context.

\[(73)\quad k\text{-entails} = \text{def} \lambda_{c:k}. \lambda_{c:c}. c\text{-entails} (cc k c)\]

Finally, we define the notion of \textit{content consistency} which is used to determine whether a content \(k\) is consistent with a context \(c\). In particular, consistency holds if a context \(c\) does not contextually entail the dynamic negation of a content \(k\).

\[(74)\quad k\text{-cons} = \text{def} \lambda_{c:k}. \lambda_{k:k}. \not\ (c\text{-entails} (\text{NOT} \ k))\]

In DyCG, definites, pronouns, and all names are analyzed as generalized quantifiers. These anaphoric triggers are defined to select the uniquely most salient antecedent in the context such that the context entails that the antecedent has the relevant descriptive content. A theory of salience, although assumed, is not implemented.

Based on the definitions above, I provide the definition of the generalized definiteness function the in \((75)\). This function selects the unique DR in the context whose corresponding entity is entailed to have the relevant property. As we will see in the next section, the generalized definiteness function will be used in the definitions of names.

\[(75)\quad \text{the} = \text{def} \lambda_{D}. \lambda_{c:c}. \lambda_{n:n}. c\text{-entails} (D n)\]

Finally, we define \(\text{pro}\), the pronominal definiteness function, as in \((76)\). Note that the difference between the and \(\text{pro}\) is that while the former requires entailment via \(k\text{-entails}\) the latter requires only consistency via \(k\text{-cons}\).

\[(76)\quad \text{pro} = \text{def} \lambda_{D}. \lambda_{c:c}. \lambda_{n:n}. c\text{-cons} (D n)\]
The reason for the difference is because pronouns only require consistency with their antecedents (Martin, 2013). In particular, Martin (2013:34) points out that all that is required for the felicitous use of a pronoun is that the context not be inconsistent with the descriptive content of the pronoun (see also Pollard & Smith 2011; Tonhauser et al. 2013).

This concludes the necessary background about the switch from the static semantics of LCG to the dynamic semantics of DyCG. I turn to some illustrative examples in the next section.

2.3.6 A small DyCG fragment

In this section, I provide some example derivations in DyCG, in particular the dynamic counterparts of the examples in §2.2. The first example I consider is the one in (77).

(77) It rained.

The derivation of (77) uses the two lexical entries given in (78a) and (78c), which are the dynamic versions of rained and the pleonastic it, respectively. Note that the phenos and the tectos of these two expressions are the same as their static counterparts. However, their semantics is dynamicized. In particular, the dynamic meaning of rained is RAIN, given in (78b). As for the dynamic meaning of the pleonastic It, note that DyCG treats all signs with tecto type NP as dynamic generalized quantifiers. Thus, the dynamic version of the pleonastic It that functions as the subject of weather predicates like rained is defined as in (78d).

(78) a. ⊢ λs. s · rained ; It →o S ; λu. RAIN
   b. RAIN =_{def} λc. λx[^c]. rain
   c. ⊢ it ; It ; *

Given the lexical entries above, the derivation of (77) is as in (79). This derivation involves a single MP step where the verb rained of type It →o S takes the pleonastic it of type It as argument. In the pheno, the term ‘λs. s · rained’ applies to ‘it’ to yield ‘it · rained’. In the semantics, the meaning of the verb rained, namely λu. RAIN applies to that of the pleonastic it, namely *, to yield the content λc. λx[^c]. rain.
(79) \[ \vdash \lambda_s. s \cdot \text{rained} ; \text{It} \rightarrow S ; \lambda_{\text{Rain}} \vdash \text{it} ; S ; * \quad \text{MP} \]

Next, consider the example in (80) whose derivation uses the two lexical entries given in (81a) and (81c). Note that the pheno and the tecto of the intransitive verb \text{slept} is identical to its static counterpart. Its dynamic semantics, on the other hand, is defined as in (81b). As for the lexical entry for \text{John}, its tecto is a QP and its semantics is that of a dynamic generalized quantifier, defined in (81d). Here, NAMED-JOHN \text{=} \text{def} (\text{dyn}_1 \text{ named-john}), and named-john is the static property of being named \text{John}. The definition given in (81d) uses the generalized definiteness function the and passes the unique DR entailed by the context to have the property of being named \text{John} to a specific dynamic property.

(80) \text{John slept.}

(81) a. \[ \vdash \lambda_s. s \cdot \text{slept} ; \text{NP} \rightarrow S ; \text{SLEEP} \]

b. SLEEP \text{=} \text{def} (\text{dyn}_1 \text{ sleep}) = \lambda_m. \lambda_c. \lambda_{x[c]} \cdot \text{sleep}_m

c. \[ \vdash \lambda_f. (f \text{ john}) ; \text{QP} ; \text{JOHN} \]

d. \text{JOHN} \text{=} \text{def} \lambda_D. \lambda_c. D (\text{the NAMED-JOHN c}) c = \lambda_D. \lambda_c. D (t_n c \text{ k-entails (NAMED-JOHN n)) c}

Given the lexical entries above, the derivation of (81) is as in (82). Note that the content of the sentence encodes the fact the input context ‘knows about’ the DR that is entailed to have the property of being named \text{John}.

Next, consider the analysis of (83) given below where I use the lexical entries in (84).

(83) \text{John helped a student.}

(84) a. \[ \vdash \lambda_{st}. t \cdot \text{helped} \cdot s} ; \text{NP} \rightarrow \text{NP} \rightarrow S ; \text{HELP} \]

b. HELP \text{=} \text{def} \text{dyn}_2 \text{ help} = \lambda_m. \lambda_m. \lambda_{c[c]>m} \cdot \lambda_{x[m]} \cdot \text{help}_m x_m x_n

Next, I consider the analysis of (83) given below where I use the lexical entries in (84).
c. ⊢ \textit{student} ; \textit{N} ; \textit{STUDENT}

d. \textit{STUDENT} \equiv \text{def} \text{dyn}_1 \textit{student} = \lambda_{n:} \lambda_{c:} \lambda_{x:n} . \textit{student} \ x_n

e. \vdash \lambda_{f} . \textit{f} \ (a \cdot s) ; \textit{N} \to \textit{QP} ; \textit{A}

f. \textit{A} \equiv \text{def} \lambda_{DE} . \text{EXISTS}_n . (D \ n) \text{ AND } (E \ n)

Given the lexical entries in (84), the derivation of (83) is given below. For reasons of space, I divide the proof into three parts. In (85), I provide the subproof showing how \emph{a student} is formed.

(85) \[
\begin{array}{rcl}
\vdash \lambda_{f} . \textit{f} \ (a \cdot s) ; \textit{N} \to \textit{QP} ; \textit{A} & & \vdash \textit{student} ; \textit{N} ; \textit{STUDENT} \\
\frac{}{\vdash \lambda_{f} . \textit{f} \ (a \cdot \textit{student}) ; \textit{QP} ; \textit{A} \text{ STUDENT} } \text{ MP}
\end{array}
\]

In the next subproof, first the verb \textit{helped} is fed an object trace (the first MP step) and then a subject trace (the second MP step). Then, the object trace is discharged (the first HP step) and the expression \emph{a student} derived in (85) takes scope and ‘lowered’ into the object position. Next, the subject trace is discharged (the second HP) so that the expression \textit{John} can take scope in subproof (87) below. Note that since names are treated as QPs in DyCG, the derivation in (86) involves providing two trace arguments for the transitive verb \textit{help}, rather than just one for the subject position as was the case in the proof of (45) in the LCG fragment.

(86) \[
\begin{array}{rcl}
\vdash \lambda_{f} . (f \ a \cdot \textit{student}) ; & & \\
\frac{}{\vdash \lambda_{f} . t \cdot \textit{helped} \cdot s ; s} & & \textit{NP} ; m \vdash s ; \\
\frac{}{\textit{NP} \to \textit{NP} \to \textit{S} ; \textit{NP}} & & m \vdash t ; \\
\frac{}{\vdash \lambda_{f} . t \cdot \textit{helped} \cdot s ; t} & & \textit{NP} ; n \vdash t ; \\
\frac{}{\textit{NP} \to \textit{NP} \to \textit{S} ; \textit{NP}} & & n \vdash \lambda_{f} . t \cdot \textit{helped} \cdot s ; \\
\frac{}{\vdash \textit{HELP} \ m \ n \ n} & & \textit{S} ; \\
\frac{}{\vdash \lambda_{f} . t \cdot \textit{helped} \cdot a \cdot \textit{student} ; t} & & \textit{NP} \to \textit{S} ; \\
\frac{}{\textit{A STUDENT}_m . (\text{HELP} \ m \ n) \ m \ n} & & \textit{MP}
\end{array}
\]
Finally, in (87), the subproofs (85) and (86) are combined and the subject John takes wide scope to yield the full sentence.

\[
\frac{}{\vdash \text{John} \cdot \text{helped} \cdot \text{a student} \cdot S \cdot \text{JOHN}_n \cdot (\text{A STUDENT}_m \cdot (\text{HELP} m n) \quad \text{MP}}
\]

The dynamic semantics in (87) reduces as follows.

\[
\text{JOHN}_n \cdot (\text{A STUDENT}_m \cdot (\text{HELP} m n) = \text{JOHN}_n \cdot \text{EXISTS}_m \cdot (\text{STUDENT} m) \land (\text{HELP} m n)\\
= (\langle \lambda_{Dc} (D \cdot \text{the NAMED-JOHN} c \cdot c) \rangle \lambda_m \lambda_{c.c} \lambda_{c+k} \cdot (\text{STUDENT} \mid c) \land (\text{HELP} \mid c \mid n))\\
= \lambda_{c.c} \lambda_{c+k} \cdot (\text{STUDENT} \mid c) \land (\text{HELP} \mid c \mid (\text{the NAMED-JOHN} c))
\]

### 2.4 Summary

In this chapter, I introduced Linear Categorial Grammar (LCG) and Dynamic Categorial Grammar (DyCG). LCG is a categorial grammar formalism for analyzing natural language where the surface form of signs are separated from their syntactic combinatorial potential (the phenogrammar vs tectogrammar distinction), an idea dating back to Curry (1961). This feature, namely the separation of word order from syntactic combinatorics, allows for a very simple grammar architecture with just two rules: Modus Ponens and Hypothetical Proof. The pheno component involves a type-theoretic implementation of a monoid on the set of strings with concatenation being the main operation used to derive surface forms. The tecto component uses linear logic with a small number of types as syntactic categories of linguistic expressions. LCG is also equipped with a semantic component written in mainstream type theory. In addition, the semantic theory used in LCG can be thought of as a generalization of Montague’s (1973) semantics, which most semanticists are familiar with. At the same time, this semantic theory avoids certain foundational problems with possible worlds approaches by not identifying senses of linguistic expressions with intensions.

DyCG builds on the grammar architecture of LCG and extends its static semantics to a dynamic one. It provides a compositional, dynamic categorial grammar for discourse analysis that captures
the main insights of the dynamic semantics tradition (Kamp, 1981; Heim, 1982): indefinites introduce new DRs, definites pick up their antecedents from the input context, accessibility constraints are captured by existentially binding variables in the scope of negation, etc. DyCG uses mainstream type theory coupled with dependent types to capture the requirement that contexts must have a certain number of DRs. Thus, it does not require complicated or idiosyncratic machinery such as specialized assignments, states, continuations, or partial functions in the modeling of discourse contexts.

In the next chapter, I extend the DyCG context model to capture the question-answer relation when I start building the K’iche’ fragment.
Chapter 3

Two focus constructions in K’iche’

In this chapter, I discuss the core data that I aim to account for and which the subsequent chapters build on, namely two focus constructions in K’iche’. An understanding of the grammar of questions and answers in K’iche’ inevitably involves an understanding of focus constructions, a much-discussed topic in the literature on Mayan (among many others, Norman, 1977; Mondloch, 1978; Larsen, 1988; England, 1991; Aissen, 1992; Trechsel, 1993; López Ixcoy, 1997; Tonhauser, 2003a; Stiebels, 2006; AnderBois, 2012; Shklovsky, 2012; Verhoeven & Skopeteas, 2015).

I discuss two focus constructions with different interpretations in K’iche’ and, in particular, distinguish between (what I call) answer focus constructions from aree focus constructions. I show that the interpretation of aree focus constructions gives rise to existence and exhaustivity implications (the latter when they are used to reply to constituent questions), neither of which necessarily arises from the interpretation of answer focus constructions. Previously, the differences in the interpretations of the two focus constructions I discuss were either overlooked (e.g., Larsen, 1988; Trechsel, 1993) or not explicitly shown to be the case (Can Pixabaj & England, 2011). Moreover, this finding goes against the standard assumption, based on Aissen 1992, that focus constructions in Mayan are interpreted like it-clefts across the board.

In this chapter, I also begin constructing a fragment of K’iche’ in DyCG and provide an analysis of answer focus constructions. Chapters 4 and 5 build on the discussion and analysis of focus constructions presented in this chapter. But before I consider the two focus constructions in K’iche’ in detail, I discuss what I mean by focus/focus constructions in the ongoing discussion.
3.1 On the notion of focus

As the reader will recall from the brief introduction in chapter 1, in Mayan languages, which are predominantly predicate-initial, focus constructions are formed by a change in word order whereby the focused expression or a constituent that contains the focused expression occurs immediately before the predicate (England, 1991). An example in K‘iche’ is given in (89a) where the focused expression *a Raul* ‘Raul’ precedes the predicate *x-Ø-war-ik* ‘s/he slept’, which in turn can be omitted as indicated by the parentheses.\(^1\) I refer to such constructions as (long/short) answer focus constructions, or (long/short) answer FCs for short. A second focus construction is exemplified in (89c) where the focused expression *a Raul* ‘Raul’ is preceded by the so-called focus particle *aree* ‘FOC’. I refer to these as *aree* FCs.

\[(89)\]

<table>
<thead>
<tr>
<th>(89)</th>
<th>a. Chin <em>x-Ø-war-ik</em>?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>CMP-A3-sleep-SS</em></td>
</tr>
<tr>
<td></td>
<td>‘Who slept?’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(89)</th>
<th>b. A Raul (<em>x-Ø-war-ik</em>).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>CLF Raul CMP-A3-sleep-SS</em></td>
</tr>
<tr>
<td></td>
<td>‘RAUL (slept).’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(89)</th>
<th>c. Aree a Raul (<em>x-Ø-war-ik</em>).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>FOC CLF Raul CMP-A3-sleep-SS</em></td>
</tr>
<tr>
<td></td>
<td>‘It was RAUL (who slept).’</td>
</tr>
</tbody>
</table>

The expressions occupying the focus position are generally understood to be semantically “prominent” in some sense (Larsen, 1988) which is reflected in the cleft/pseudo-cleft translations into English, a standard practice in the literature on Mayan (e.g., Larsen, 1988; Aissen, 1992; Trechsel, 1993; AnderBois, 2012). The reason why I do not follow this tradition for sentences like (89a) will become clear below in §3.2 where I argue for a distinction between the two focus constructions in (89b,c). Before I delve into a detailed discussion of this issue, however, I consider the notion of focus in general and then review some of the main approaches to focus before I discuss my assumptions.

\(^1\)SMALL CAPS in translations indicate prosodic prominence.
As Büring (2010) points out, the term *focus* has been used to refer to a broad range of linguistic phenomena and there is extensive cross-linguistic literature on this topic. There does not, however, seem to be a general agreement as to what clearly and uniformly defines the notion of focus. Presumably, the lack of a uniform definition of focus has to do with the fact that what has been called focus lies at the interfaces between morphosyntax, intonational phonology, and semantics/pragmatics,\(^2\) and that not every scholar makes the same background assumptions when working on a given language.

In the semantics and pragmatics literature, it is typically assumed that focus refers to an expression in a sentence that is “highlighted” or “emphasized” by some grammatical means due to its discourse function (Büring, 2010; Büring, 2011). As I noted in chapter 1, this seems to have been the general approach in Mayan linguistics, too, in terms of the way that the expressions in the focus position are characterized (e.g., Norman, 1977; Larsen, 1988). For example, Kadmon (2001:251) writes that in English, there is a correlation between certain prosodic patterns and certain semantic/pragmatic effects, and ‘focus’ is a theoretical notion used to account for this correlation. To illustrate, consider the oft-cited examples in (90a) and (90b) with prosodic prominence on *Bill* and *Sue*, respectively. As Kadmon points out, (90a) and (90b) differ in the discourse contexts in which they can be used. For example, (90a) can be an answer to (91A) but not to (92A), whereas (90b) can be an answer to (92A) but not to (91A).

(90) a. I introduced **BILL** to Sue.
   b. I introduced Bill to **SUE**.

(91) A: Who did you introduce to Sue?
   B: I introduced **BILL** to Sue.
   B′: I introduced Bill to **SUE**. (Kadmon, 2001:251)

(92) A: Who did you introduce Bill to?

\(^2\)Beaver et al. (2007) identify four different notions of focus used in the literature: phonetic, phonological, syntactic and semantic.
B: I introduced Bill to Sue.

B':#I introduced BILL to Sue. (Kadmon, 2001:251)

As far as its realization is concerned, focus can be indicated by prosodic prominence as in (90), or by morphosyntax, a combination of morphosyntax and prosodic prominence, or even nothing at all (Büring, 2011). For example, in English, accenting has been taken as the primary source of prosodic prominence marking to indicate focus (Rooth, 1992; Kadmon, 2001; Féry & Samek-Ladovici, 2006). For languages other than English, research has shown that prosodic prominence on a focused expression may be realized through a variety of phonetic and phonological means. For example, in some languages, e.g., Italian (Grice et al., 2005) and Spanish (Face, 2002), different pitch accents are used to indicate focused expressions. In some other languages, e.g., Korean (Jun, 2005) and Japanese (Venditti et al., 2008), prosodic prominence is realized through phrasing, namely by placing a prosodic phrase boundary before or after the focused expression to indicate prominence. In these languages dephrasing can be used to mark expressions as less prominent, which is similar to the use of deaccenting in English. It is also reported that for some languages similar effects of pragmatic meanings on prosody do not exist. For example, it is claimed that in Yucatec Maya there is no interaction between topic/focus and pitch manipulations (Kügler et al., 2007; Kügler & Skopeteas, 2006). More generally, recent work suggests that there are languages where no prosodic reflexes of focus are observed, e.g., Northern Sotho (Zerbian, 2006), Hausa (Hartmann & Zimmermann, 2007), and Wolof (Rialland & Robert, 2001). A commonality across these languages is the use of word order changes and/or morphology to indicate information structural properties of utterances.

As for the pragmatic functions of focus, Büring (2011) points out that they seem wide and varied, and that they are sometimes characterized in vague terms like “speaker’s highlighting”, “most important information”, “evoking alternatives”, etc. In more formal approaches to focus interpretation, the discourse distribution of focus is taken into consideration to predict which expression in a given sentence would be focused. Kadmon (2001) calls this the effect of focus on discourse
congruence. Consider, for example, the sentence in (300) where the focused expression coffee receives prosodic prominence. Büring notes that when taken as an answer to a constituent question, (93) can be an answer to What did they order at the bar?, but not to, say, Where did they order coffee? or Who ordered coffee? Thus, similar to (91) and (92) above, in an answer to a question, the expression corresponding to the question word is taken to be focused. Similarly, Büring notes that when (93) is taken as a correction, it can be used as a correction to They ordered beer at the bar but not to, say, They spilled coffee at the bar. Thus, in a correction, the expression that differs from the corrected sentence is focused. According to Kadmon (2001:253), such cases of explicit contrast are also often mentioned as a diagnostic for identifying focus alongside question-answer pairs.

(93) They ordered COFFEE at the bar.

An important issue that Büring (2010) raises in relation to the interpretation of sentences like (93) is whether what is referred to as focus is the same kind of focus in any given instance of focus or whether different kinds of focus should be grammatically distinguished, e.g., answer focus, corrective focus, identificational focus, etc. As Kadmon (2001:252-253) points out, the non-uniform behavior of the phenomena analyzed as focus has led some researchers to argue that we must, in fact, distinguish different kinds of foci, each with its particular discourse function (see, e.g., Rochemont 1986; Erteschik-Shir 1986; É. Kiss 1998; Vallduví & Vilkuna 1998; Gussenhoven 2008). More generally, there is, as Büring (2010) points out, a larger question of how focus is identified in a given language and whether there is a common definition of focus or of focus-triggering context that would lend itself to a unified analysis. In other words, the issue is whether there is a theoretical notion of focus that is clearly defined that would help identify when an expression is focused or when a construction counts as a focus construction. Despite certain commonalities, the opinions on this issue diverge, a point I come back to at the end of this section.

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3As I discuss below, some scholars, e.g., Schwarzschild (1994, 1997); Roberts (1996/2012); Beaver & Clark (2008); Onea (2016), among others, argue that focus invariably plays a discourse-regulating role in the sense that focusing helps regulate the flow of information in discourse.
In the rest of this section, I survey some of the main approaches to focus interpretation before I present my own assumptions. In doing so, I have two main goals. The first goal is to discuss how the literature identified what it means to be focus and how the analyses of various focus phenomena were formulated. The second is to introduce some of the main approaches in the literature on focus which I come back to later in this chapter and in the rest of this thesis: in particular, alternative semantics, structured meanings, and question-based frameworks of discourse. I point out the common insights that these approaches have and aim to better situate my assumptions within the previous literature. I start with Rooth’s alternative semantics (Rooth, 1985, 1992) as it is one of the most prominent theories of focus interpretation. I also discuss the (perhaps lesser-known) scopal analysis of focus that Rooth entertains (Rooth, 1996) since the analysis of focus constructions I propose in this thesis is in a similar vein. Next, I discuss Schwarzschild’s work (Schwarzschild, 1994, 1997), which builds on Rooth’s and suggests an analysis of the kind of data that have been mainly used to identify focus in the literature. Finally, I discuss Roberts’ work (Roberts, 1996/2012) as a related approach to Rooth’s and Schwarzschild’s which serves as background to question-based approaches to discourse and, in particular, to the analysis of sentences or sentence fragments which are discussed in the literature on focus but which do not follow interrogatives in discourse.

3.1.1 Rooth 1985, 1992, 1996

Rooth (1985, 1992, 1996) analyzes several focus-triggering phenomena on which he builds his influential theory of Alternative Semantics for focus interpretation. In this theory, focused expressions are assigned a second (or an additional) semantic value as a reflex of intonational focus marking. Given a phrase $\alpha$, this additional semantic value, called the focus semantic value of $\alpha$ and denoted by $[\alpha]^{f}$, is obtained by making a substitution in the position corresponding to the focused element. To illustrate, the focus semantic value of (94a) is given in (94b), and the ordinary semantic value of the former, denoted by $[\alpha]^{o}$, is drawn from the latter. The focus semantic value of (94c), on the other hand, would be as in (94d). In both (94b) and (94d), $x$ ranges over a contextually determined set $E$ of individuals. As Rooth (1996:277) points out, the ordinary semantic value is
not directly affected by focus and, therefore, both (94a) and (94c) would have the same ordinary semantic value. What distinguishes these two sentences with different focus markings is their focus semantic values.

(94)  

a. Mary likes Sue.  

b. $\left[[S \text{ Mary likes Sue }]\right]^f = \{\text{like}(m, x) : x \in E\}$  

c. MARY likes Sue.  

d. $\left[[S \text{ MARY likes Sue }]\right]^f = \{\text{like}(x, s) : x \in E\}$

Rooth discusses several focus-triggering constructions including focus sensitive expressions like only, sentences involving focus on contrastive pairs, focus triggered scalar implicature, question-answer pairs, and bare remnant ellipsis. According to Rooth, the common core of all these constructions is that focus evokes alternatives and that the focus semantic value of an expression is anaphorically linked to a contextually salient set of alternatives. In particular, Rooth posits a single operator, notated by the symbol $\sim$, which introduces a presupposed alternative set subject to the requirements given in (95). Here, $\sim$ is the focus interpretation operator. $C$ is a free variable which needs to find an antecedent and whose interpretation is constrained by focus interpretation. The reference of $C$ is not fixed, though, as, in any given instance of focus, it is identified with some semantic or pragmatic object present for an independent reason (Rooth, 1996:278).

(95) Where $\phi$ is a syntactic phrase and $C$ is a syntactically covert semantic variable, $\phi \sim C$ introduces the presupposition that $C$ is a subset of $[[\phi]]^f$ containing $[[\phi]]^o$ and at least one other element. (Rooth, 1996:279)

To illustrate, consider the focus interpretation of (94a) in a context where it answers the question Who does Mary like?. In this case, the focus interpretation operator would have scope over the answer, and $C$ would be a set of propositions of the form “Mary likes $x$” for some $x$, containing the proposition “Mary likes Sue” and at least one other element. According to Rooth, assuming a semantics for questions in the style of Hamblin (1973), the question would denote the set of
propositions corresponding to its possible answers. In the present case, the ordinary semantic value of the question would be the set of propositions of the form “Mary likes x” for some x. Thus, both the answer and the question would contribute consistent characterizations of the set C. Rooth notes that identifying the variable C with the semantic value of the question is a matter of anaphora resolution.

To sum up, Rooth’s analysis of focus makes reference to compositionally derived alternatives and anaphora to a salient set of contextually available alternatives.

Although Rooth 1985, 1992 and subsequent literature using alternative semantics employ recursively derived focus semantic values in focus interpretation (e.g., Beaver & Clark 2008), Rooth (1996) suggests adopting a compositional mechanism of scoping which eliminates focus semantic values. This approach, suggested in Chomsky 1976, assigns scope to focused phrases as if they were quantifiers. Here, the term scope is used to indicate the level at which focus is interpreted, which corresponds to the level in which ∼ would introduce the variable C in the focus interpretation principle in (95). For example, (94a) would be assigned the meaning in (96) in the scoping analysis.

\[
(96) \quad [S \text{ NP Sue }]_F(A,C)[S \lambda x. [S \text{ Mary likes } x]]
\]

In (96), the elements of meaning which are previously introduced by ∼, namely the semantic objects that are used in focus interpretation, are now folded into the meaning of the focus feature F. In particular, in the general representation \( F(A,C)(x)(P) \), \( F \) acts as the principal operator in the compositional analysis of focus and it takes two arguments: the scoped phrase \( x \) (Sue in (96)), and the abstract \( P(\lambda x. [S \text{ Mary likes } x] \) in (96)). The variable A stands for the set of alternatives to \([x]_o\). Thus, the semantic representation of focus includes a representation of the alternatives to the focused expression itself. As for what \( F(A,C)(x)(P) \) asserts, it is simply \( P(x) \). In addition, to get the right characterization of C, Rooth (1996:291) says that \( F(A,C)(x)(P) \) introduces a presupposition that A contains x and some other element, and C is the set of propositions obtainable as \( P(y) \), where y is in A.\(^4\) Crucially, Rooth (1996:281) claims that, in general, any desired semantics for focus could be encoded by choosing an appropriate semantics for the focus feature F.

\(^4\)Note the analogy to the focus interpretation operator ∼ introducing a presupposition in (95).
Note that the scopal analysis that Rooth outlines encodes a common insight in the literature on focus, namely that the interpretation of focus bifurcates the content of the expression which contains the focused expression into two parts. Beaver & Clark (2008:25), for example, refer to these two parts as the meaning of the focused part and the meaning of the background. As Rooth (1996:275) points out, this idea is already present in Jackendoff 1972, and was developed in more detail in what came to be known as *Structured Meanings* (e.g., Jacobs, 1983; von Stechow, 1991; Krifka, 2001), where the effect of focusing is explicitly encoded in the meaning assigned to a sentence. For example, in Structured Meanings, the sentence in (94a) would be analyzed as the ordered pair \((\lambda x. \text{likes} (m, x), s)\) consisting of the meanings of the non-focused (background) and focused parts of the sentence.\(^5\) In general, the notion that focus divides a sentence into two parts can be seen as a reconstruction of the notion that focus can have the effect of dividing a sentence into a theme and a rheme, a psychological subject and a psychological predicate (Rooth, 1996:275).

### 3.1.2 Schwarzschild 1994, 1997

In Schwarzschild’s (1994,1997) account, the function of focus is based on binary contrast as well as question-answer congruence (recall the discussion in §3.1 of question-answer congruence and contrast as diagnostics for focus). Schwarzschild argues that each utterance in discourse is appropriately related to some previous utterance or move in such a way that the former is contrasted with the latter. The antecedent utterance can be a statement or a question, and it may or may not be the immediately preceding utterance. Schwarzschild formulates his general constraint on contrast as in (97) and his constraint on the use of focus as in (98).

(97) An utterance \(B\) is felicitously contrasted with another utterance \(A\) only if \([A]^o \neq [B]^o\) and \([A]^o \in [B]^f\) or \([A]^o \subseteq [B]^f\).

(98) A constituent may be focused only if it is contained in an utterance \(B\) such that there is some utterance \(A\) in the discourse such that \([A]^o \neq [B]^o\) and \([A]^o \subseteq [B]^f\).

\(^5\)In §3.3.4, I will return to a discussion of the structured meanings analysis of questions and answers.
The way that Schwarzschild constrains the use of focus draws on Rooth’s analysis of focus interpretation in that the felicitous use of focus in a clause involves the existence of at least one alternative proposition in its focus semantic value. However, Schwarzschild’s focus constraint is formulated as a relationship to previous utterances in the same discourse. According to Kadmon (2001:335), this explicit requirement makes focusing a discourse-regulating device in Schwarzschild’s theory. Rooth, on the other hand, discusses a variety of focus-triggering constructions not all of which have to do with discourse congruence.

3.1.3 Roberts 1996/2012

Roberts (1996/2012) adopts the view, which goes back to Carlson 1983, that information in discourse is organized in relation to questions being addressed by interlocutors. Roberts formulates, similar to Schwarzschild (1994; 1997), a constraint on the use of focus in terms of some preceding move in discourse. However, while no special status is given to questions in Schwarzschild’s account, in Roberts’ account, the antecedent move is always a question and, in particular, what is called a Question Under Discussion (QUD).  

A QUD is technically a semantic question, analyzed as a set of propositions, and it becomes the current discourse topic once it is accepted (Roberts, 1996/2012:93). A QUD may be an actual question that is asked or it may be implicit, inferred based on other cues. Either way, a question that has been raised, either explicitly or implicitly, gets added to what is called a QUD-stack, the collection of those questions that are assumed to be under discussion in discourse. The QUD-stack is conceived of as a push-down store where the questions are stacked on top of each other, and the topmost question must be the first one to be popped off the stack. According to Roberts (1996/2012:107), addition of a question to the QUD-stack entails a strong commitment on the part of the interlocutors to answer it. A question remains on the QUD-stack until it is answered or determined to be unanswerable by the interlocutors.

QUDs are called D-topics by Büring (1997) and controlling questions by van Kuppevelt (1995:128).
Similar to Rooth and Schwarzschild, Roberts formulates a presuppositional constraint on the felicitous use of focus. To discuss what this constraint amounts to, I will first introduce some terminology that Roberts uses. First, in Roberts’ framework both questions and their answers, assertions, have focus semantic values. Focus semantic values are calculated similar to Rooth’s and Schwarzschild’s theories, but in Roberts’ theory both foci in assertions and wh-words in questions are replaced by variables. Using this revised notion of focus semantic value, Roberts provides a general definition of what’s called congruence (von Stechow, 1991), given in (99). Here, the Q-alternatives of a question \( \alpha \) is just the denotation of the question \( \alpha \) and the move \( \beta \) can be an assertion or a question. Thus, congruence in Roberts’ theory requires that the focus semantic value of a move be identical to a question.

\[
\text{(99) } \text{Move } \beta \text{ is congruent to a question } ?(\alpha) \text{ iff its focal alternatives } [\beta]_f^t \text{ are the Q-alternatives determined by } ?(\alpha), \text{ i.e., iff } [\beta]_f^t = \text{Q-alt}(\alpha). \\
\text{(Roberts, 1996/2012:111)}
\]

Based on the definition of congruence, the constraint on the use of focus in an utterance \( \beta \) is formulated as in (100). Here, as above, \( \beta \) can be a question or an assertion.

\[
\text{(100) } \beta \text{ is congruent to the question under discussion at the time of utterance.} \\
\text{(Roberts, 1996/2012:112)}
\]

As a result of the above definitions, focus is taken to invariably indicate what question is under discussion in discourse and this intuition is used as a basis for the formal analysis of focus. In particular, the Gricean notion of relevance, which directs interlocutors to make their utterances relevant to prior discourse, becomes relevance to a QUD in Roberts’ framework. Every utterance in discourse, whether it is an assertion or a question, needs to be relevant to the current QUD. This notion of relevance is formulated as in (101).

\[
\text{(101) } \text{A move } m \text{ is relevant to the question under discussion } q \text{ iff } m \text{ either introduces a partial answer to } q \text{ (} m \text{ is an assertion) or is part of a strategy to answer } q \text{ (} m \text{ is a question).} \\
\text{(Roberts, 1996/2012:104)}
\]
If a move $m$ is an assertion, then relevance requires it to be a *partial* answer to $q$, i.e., an answer that contextually entails the truth value of at least one element in the denotation of the question. On the other hand, if $m$ is a question, then it is required to be part of what’s called a *strategy* to answer $q$. A strategy is a sequence of questions where a *superquestion* $Q_1$ is said to entail a *subquestion* $Q_2$ iff the complete answer to $Q_2$ contextually entails a partial answer to $Q_1$ (Roberts, 1996/2012:94). (For example, *What do you like?* entails *What food do you like?*) Thus, if $m$ is a question, then relevance requires it to be a subquestion of $q$, which would make it part of a strategy to answer $q$.

Finally, an important characteristic of Roberts’ framework is that, as in other question-based accounts of discourse, it allows for questions to be implicit since in actual discourse many utterances do not follow explicit questions. In most cases, the idea that the speaker thinks that a certain question is of interest becomes evident only after they provide an answer. As a result, it is claimed that the interlocutors need to accommodate the intended question when they hear the answer.

### 3.1.4 On the notion of focus used in this thesis

In this section, I discuss my own assumptions about the term focus and situate the data and the analysis in this thesis within the literature I discussed above.

As I mentioned in §3.1.1, a common insight in the literature on focus is that focus divides the sentence it is a part of into two: focus and background, rheme and theme, etc. However, there seems to be more to it then just this division that focusing brings about, at least when it comes to the compositional semantics of focus. In particular, once a subexpression of a linguistic expression, call it $F$, is identified as focused by some grammatical means, and the rest of the sentence, call it $C$, is identified as not focused, the issue is how the meanings of $F$ and $C$ are to be put together to yield the meaning of the whole expression in a such way that the informational structural properties of the utterance are captured adequately. At this step, one can imagine different ways in which $F$ and $C$ can be manipulated to capture the desired interpretation of the utterance. In other words, focusing makes available these two meaningful units which can be used in certain ways to convey different implications associated with the utterance, e.g., what is asserted, what is presupposed,
what is conventionally implicated, etc. I believe that this is the essence of Rooth’s (1996) claim that selecting a different semantics for the focus feature $F$ would, in general, yield the desired semantics for focus. This point, thus, applies to the analysis of different kinds of focus that Rooth discusses, one of which involves answers to questions.

The analysis I propose of the two focus constructions in K’iche’ is in the same spirit as the scopal analysis of focus in Rooth 1996 despite being different in details. For example, I define a *long answer focus* operator, essentially an inaudible lexical entry, which takes two arguments (similar to Rooth’s focus feature $F$): the meaning of the focused expression and the meaning of the non-focused part of the sentence, and uses them in a certain way to encode what it means to be an answer. As I mentioned in chapter 1, however, I do not assume a theoretical notion of ‘focus’ in this thesis nor do I analyze ‘focus’ as a monolithic phenomenon. More precisely, I do not assume that what is called focus, in general, is “contrastive”, “the most important/new information”, or that it “evokes alternatives”, or “answers the question”, etc. Therefore, such notions which are used in the literature do not, *a priori*, figure into the analyses of the data that I discuss. In the case of K’iche’, this amounts to saying that the preverbal position identified as the focus position may, in principle, have to do with expressing something about the information structure of an utterance, but I do not identify this position with a single information structural property.

In principle, this idea could be applied to any language where the same grammatical means is used to indicate potentially different information structural properties of utterances. In English, for example, intonation is used for several linguistic phenomena most of which have to do with the information structure of the utterance. But, it does not necessarily follow that all these phenomena should be treated as being instances of one particular phenomenon. In particular, the string realization of an utterance and its intonation can be separated which would allow for ambiguity with respect to the tune of the utterance. We could then say, for example, that “answers (or foci in answers) in English bear such and such a tune” rather than saying “such and such a tune means answer focus.” As I discuss below, the fragment of K’iche’ that I develop in this thesis is based on the discourse functions of the so-called focus constructions that I have been able to identify so
far. For example, I use the term answer for sentences or sentence fragments which are anaphoric to questions contributed by interrogatives, and it is this property, namely what it means for a sentence following an interrogative to be an answer—rather than a mere reply/response—that I intend to capture in the analysis of answer focus constructions.

Currently, I leave open the possibility that sentences which have the same form as what I call answer focus constructions can be used in, say, corrective contexts as in (102), in contexts providing additional information about a salient antecedent as in (103), or without a certain linguistic antecedent, i.e., a particular question asked, as in (104), where what B says provides more than a simple yes answer to the polar question A asks. I make no attempt to analyze such examples in this thesis but the issue seems to be about what needs to be recovered so that the hearer could interpret what B says. Based on the previous literature I discussed above, one could ask the following questions: would examples like (102)-(104) be best analyzed as involving implicit questions that are to be accommodated based on what B says, e.g., What did Mary bring to the party? in (102) and Who won the football pool? in (104)? Or could these examples be analyzed as anaphora to salient properties in prior discourse where the discourse function of focusing in general is to instruct the speaker to recover a salient and plausible property that the focused expression can bear?

(102) A: Mary brought wine to the party.
   B: No, (she brought) BEER.

(103) A: I heard that Raul speaks an exotic language.
   B: Yes, (he speaks) K’ICHE’.

(104) A: Did anyone win the football pool?
   B: Yes, MARY (won it).

Although I do not provide an analysis or a discussion of examples like (102)-(104) other than the discussion in this section, I do acknowledge that sentences which have the same form as what I

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call long/short answer focus constructions in K’iche’ can occur in non-interrogative contexts.\textsuperscript{7} One potential area of future research is to explore whether the analysis in such non-interrogative contexts involves accommodating implicit questions so that all instances of the use of focus constructions can be considered answers. In such an account, the analysis of answers that I propose in this thesis would presumably generalize to those cases. However, I also leave open the possibility that such cases involve different constructions which are not treated on a par with answers. For that reason, I also acknowledge alternative approaches in the literature where there are different mechanisms for examples like (102)-(104), in the vein of Rooth or Schwarzschild discussed above as well as Culicover & Jackendoff 2012 and Asher & Gillies 2003, where the analysis of such sentences or sentence fragments do not make reference to questions.

Especially interesting, in this connection, would be to explore the cases discussed extensively in Stainton (2005, 2006) and Elugardo & Stainton (2004), where the so-called “fragment” expressions, i.e., sub-sentential expressions, are used discourse initially to make assertions but with no linguistic background, that is, with no linguistic items spoken or otherwise made salient. For example, a speaker saying \textit{From Spain} while holding up a letter and thereby conveying the proposition that the letter is from Spain, or two people looking into a room, and seeing a horrible mess on the floor and one of them saying \textit{Fido} and thereby conveying that Fido did it, even though there is no linguistic antecedent. Or to take another example, a speaker saying \textit{Nice dress!} to a woman walking by and thereby making an assertion about her dress. Stainton’s main concern is to argue against a syntactic ellipsis analysis of these kinds of examples. For the present discussion, the main issue is whether such examples are best analyzed as answers and therefore as involving implicit questions, or whether the salient antecedent intended by the speaker, be it a property, an object, an event, etc., can be recovered by the hearer who can then arrive at the intended interpretation without making reference to an implicit question. The investigation and the proper linguistic analysis of these kinds of data, although extremely interesting, are not in the purview of this thesis.

\textsuperscript{7}Unfortunately, I do not have all the relevant data in K’iche’ to discuss these cases let alone provide an analysis.
Having sketched some of the main approaches to focus interpretation, their common insights, and discussed my own assumptions, I now turn to a discussion of two focus constructions in K’iche’.

### 3.2 Two kinds of focus constructions in K’iche’

In this section, I turn to a detailed discussion of the two focus constructions I consider in this chapter, namely answer FCs and aree FCs.

A widespread assumption about focus constructions in Mayan has been that they are interpreted like *it*-clefts in English in that they are associated with existence and uniqueness/exhaustivity implications (Aissen, 1992; Trechsel, 1993; Shklovsky, 2012). For example, drawing on data from Tzotzil, Aissen (1992:49-50) claims that focus constructions in Mayan are interpreted like *it*-clefts in English. She argues that focus constructions are associated with an existence presupposition, namely that there is an individual with the property under discussion. She provides the example in (105), taken from the middle of a text in Tzotzil, where one individual, walking along, meets another working in a field. According to Aissen, in (105b) there is a presupposition to the effect that there was something that the man was planting and that the focused expression *chobtik* ‘corn’ is the unique entity that satisfies this presupposition.

(105) a. ‘I’m planting. I’m planting stones, I’m planting trees’,

   b. Pero chobtik tTZ’un un.
   but corn he.plants CL
   ‘But it was corn he was planting.’ (Aissen, 1992:49)

Aissen claims that the existence implication associated with focus constructions remains an utterance implication when such sentences are negated or turned into interrogatives. In addition, she argues that the denotation of the focused expression is asserted to be the unique entity with the property denoted by the post-focal expression. Related to this second implication, namely uniqueness, note that in the literature on *it*-clefts, the term uniqueness is sometimes used interchangeably with

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8By an implication, I mean a proposition communicated by the utterance of a sentence.
the term *exhaustivity*. The exhaustivity implication of an *it*-cleft is taken as identifying the entity denoted by the focused expression as the only (or maximal) entity bearing the property under discussion (among others, Horn, 1981; Szabolcsi, 1981; Percus, 1997; Roberts, 1998; É. Kiss, 1998; Krifka, 2008; Büring, 2011; Velleman et al., 2012). I discuss the exhaustivity implication in more detail later on.

Although the arguments that Aissen made were based on one Mayan language, namely Tzotzil, her claims seem to have been uncritically adopted in the literature without providing language-internal evidence from other Mayan languages. For example, Trechsel (1993:42) claims that, just as in Tzotzil, focus constructions in K’iche’ have an existence presupposition and follows Aissen in claiming that such sentences assert that the entity denoted by the focused expression is the only entity in the domain of discourse that has the property in question. However, he does not show that the interpretation of focus constructions in K’iche’ gives rise to these implications. Similarly, Shklovsky (2012), in his work on Tzeltal, adopts Aissen’s analysis without providing language-internal evidence. He claims that preverbal focus in Tzeltal should be analyzed as *identificational focus* (É. Kiss, 1998) because its interpretation gives rise to an exhaustivity implication. Yet, the example Shklovsky provides, given in (106), does not show whether the interpretation of preverbal focus in Tzeltal gives rise to such an implication as there is no evidence that such an implication arises nor that it is a presupposition.

(106) te Ami-he’ ja’ alaxax a s-we’.
DET Ami-CL FOC orange ASP E3-eat
‘Ami, it’s oranges that she eats.’

⇝ ‘Ami doesn’t eat anything else.’ (Shklovsky, 2012:136)

That focus constructions involve an existence presupposition was also assumed by AnderBois (2012:367) who claims that the interpretation of focus constructions in Yucatec Maya gives rise to an existence presupposition. Although AnderBois doesn’t explicitly show, based on data from Yucatec, that the focus constructions in the language have this property, he notes that speakers reject...
the utterance of focus sentences in contexts where such a presupposition is not satisfied or not easily accommodated.

To the extent that they are based on empirical evidence from the Mayan language in question, the claims in the literature about (i) the implications associated with focus constructions, and (ii) their behavior when embedded under entailment-canceling operators seem to be based on English translations. In other words, focus constructions in Mayan languages themselves are not shown to have these implications with the alleged behavior. However, as Matthewson (2004:389) argues, translations do not provide direct evidence for meaning. Matthewson points out that reliable evidence for meaning can be obtained from judgments by native speakers elicited for sentences uttered in particular contexts. Therefore, whether the interpretation of focus constructions gives rise to the implications mentioned above and whether some of these implications remain utterance implications under entailment-canceling operators ought to be determined based on native speaker judgments elicited in properly constructed contexts (Matthewson, 2004; Tonhauser et al., 2013).

As mentioned above, alongside answer FCs there is another focus construction in K’iche’, namely the one I call aree FCs, where focused expressions are preceded by the focus particle aree9 ‘FOC’ as in (107a), and where focused expressions have to occur before the predicate, given (107b,c).10

(107) a. Aree a Raul x-∅-war-ik.
FOC CLF Raul CMP-A3-sleep-SS
‘It is RAUL who slept.’

9As aree can also be used as a copula as in (i), K’iche’ seems to behave like those languages where the morphological focus marker is cognate with the copula in the language (É. Kiss, 2006).

(i) A Raul aree jun tijoxel.
CLF Raul aree one student
‘Raul is a student.’

10The example in (107b) is marginal for the consultants I worked with who commented that “this is not the usual way of saying it.” Such sentences where aree and the focused expression are separated get worse when there is more intervening material between the two expressions.
b. ?Aree x-∅-war a Raul.  
   FOC CMP-A3-sleep CLF Raul  

c. *X-∅-war aree a Raul.  
   CMP-A3-sleep FOC CLF Raul  

Although, historically, the interpretations of the two focus constructions in K’iche’ have not been distinguished (e.g., Larsen, 1988; Trechsel, 1993), in their recent study on K’iche’ texts, Can Pixabaj & England (2011) argue that these constructions have different interpretations. In particular, Can Pixabaj & England argue that there are two types of focus in K’iche’. The first type of focus is what they call “contrastive focus” which “usually requires an explicit contrast” and which, they claim, “operates much like English cleft in terms of usage and meaning” (p.23). According to Can Pixabaj & England, this kind of focus requires the use of the focus particle aree ‘FOC’ with definite nominals\(^{11}\) as well as the agent focus form of the verb when ergative arguments are focused as in (108). Can Pixabaj & England (2011:22) say that the focused expression in (108) “explicitly contrasts ‘my parents’ with ‘me’, identified negatively in the previous clause (‘it wasn’t I who saw’).”

(108) Pero aree r-in-taat k-e-tzjo-n-ik.  
   but FOC DET-E1-father ICP-A3P-recount-AG-SS  
   ‘...but it was my parents who recounted (it).’ (Can Pixabaj & England, 2011:22)

Although Can Pixabaj & England (2011) claim that aree FCs are interpreted like *it*-clefts in English they do not provide empirical evidence for this claim apart from translations. Like the previous accounts, they do not show whether, say, (108) has implications that would justify comparing its interpretation to that of an English *it*-cleft. Moreover, as Matthewson (2004:371) points out, the relevant evidence for such a claim cannot be obtained from texts as one needs negative evidence, that is, evidence for when one cannot use a cleft-like construction.

\(^{11}\)Regarding the definite-indefinite distinction in K’iche’, Can Pixabaj & England say “[w]e consider those that have no article or possessor, or have only the indefinite article *jun* to be “indefinite”, while we consider those that are accompanied by one of the definite articles *wa, le, ri* (with or without the indefinite article), are possessed, are accompanied by demonstratives, or are proper names to be “definite””. Can Pixabaj & England also claim that *xow* ‘only’ can precede definite nominals in contrastive focus contexts but they do not provide examples.
The second type of focus that Can Pixabaj & England (2011:23) identify is used to “present new information,” “mention a participant for the first time” or “reintroduce information.” This type of focus is not used for “explicit contrast of old information,” nor does it require the use of the particle aree ‘FOC’ or the use of the agent focus form. The following example, the first sentence of a recording, illustrates “mentioning a participant for the first time” where “the speaker is identifying the person who will speak, from a pool of all who are present” (p.23).

(109) Chanim, le don Santiago k-∅-u-tzijoj cha-q-e jas le u’istoria r-ech now DET don Santiago ICP-A3-E3-tell PREP-E1P-DAT what DET E3-history E3-GEN we jun tinamit Santa Lu’s.
   DET one town Santa Lucía‘Now don Santiago will recount the history of the town of Santa Lucia.’
   (Can Pixabaj & England, 2011:24)

The following is an example where the focus “reintroduces a participant,” ri achi ‘the man’, which “was spoken of about 50 clauses ago, using rajawal ‘master’” (p.24).

(110) es ke ri achi, ri r-ajaw w-u’lew rii’, ∅-k’o jun u-tajkil aw-uuk’
   it.is that DET man DET E3-master DET-land DEM A3-exist one E3-errand E2-COM
   ‘...it is that the man, he who is the master of this land, has an errand with you...’
   (Can Pixabaj & England, 2011:24)

Since Can Pixabaj & England do not explicitly provide the contexts in which these sentences are uttered, we do not know what the immediately previous contexts are and, therefore, we do not know whether le don Santiago ‘Don Santiago’ in (109) or ri achi ‘the man’ in (110) are focused or topicalized. In fact, later on in the paper, Can Pixabaj & England (2011:26) note that this type of focus has the same function as a (non-contrastive) topic and the only difference between them is that the latter is followed by a comma in their textual data. All in all, given the lack of explicit contexts and definitions, it is hard to assess Can Pixabaj & England’s claims.

In the next section, I turn to a discussion of how the two focus constructions in K’iche’ differ in terms of their interpretations by considering the implications that are associated with them.
3.3 Implications associated with focus constructions in K’iche’

In this section, I show that answer FCs and aree FCs differ in their interpretations. In particular, the interpretation of aree FCs gives rise to existence and exhaustivity implications (the latter when they are used to reply to constituent questions) neither of which necessarily arises from the interpretation of answer FCs. I first discuss the existence implication of aree FCs (and the lack thereof in answer FCs), deferring the discussion of the alleged exhaustivity implication for later. After considering these two implications, I turn to a discussion of answer FCs.

3.3.1 Existence implication of aree FCs

In this section, I first show that the interpretation of aree FCs gives rise to an existence implication, an implication which makes an aree FC an anaphoric construction. Then, I provide several examples to motivate the claim that an aree FC is used to specify the antecedent it is anaphoric to, which the speaker considers to be insufficiently specified.

The existence implication of aree FCs acts as a constraint on the common ground (CG) and requires that there be an (possibly plural) individual with the property under discussion. In (111), for example, if the existence of an individual with the relevant property (here, having a computer) in a given domain (here, Maria’s class) is not in the CG, then using the aree FC is not acceptable as shown in (111b). Crucially, answer FCs are not subject to this requirement as shown in (111a).

(111) Context: An inspector from the Ministry of Education is visiting the community. He’s surveying all the primary school teachers asking them questions about their students: Who (in your class) has a computer? Who has more than two siblings? Whose parents are divorced?, etc. Maria, a teacher, knows that in her class, Raul has a computer. When the inspector asks his first question, she says:

a. A Raul (k’o jun u-kematz’ib’).
   CLF Raul exist one E3-computer
   ‘RAUL (has a computer).’
However, in a minimally different context—call this context (111′)—where the existence implication is entailed by the CG, say, because the principal or another teacher told the inspector about Maria’s class and Maria knows that the inspector knows about this, then (111b) becomes acceptable alongside (111a). This shows that an answer FC like (111a) can be used whether the CG satisfies the existence implication or not, but an aree FC can only be used when it is satisfied.

The difference with respect to an existence implication between answer FCs and aree FCs in K’iche’ can also be observed in answers and it-clefts in English. To illustrate, consider the example in (112) from Pollard & Yasavul in press. Here, it is not mutually known that there are kids who like snakes and, in fact, there is an expectation on the part of Jack Hanna that there are none. In such a context, (112a) and (112b) are felicitous while the it-cleft response in (112c) isn’t.12

(112)  a. Jack Hanna: Okay kids, who likes snakes?


    c. Kid: Greg and Dan.

    d. Kid: #It is Greg and Dan.

On the other hand, in a context like (113A) where it is inferable or mutually known that there are individuals with the property under discussion, an it-cleft response like (113B) becomes felicitous alongside the non-cleft answer in (113B′).

(113)  A: Hey, who took those last 2 slices of pizza in the lounge?

    B: It was Greg and Dan.

    B′: Greg and Dan.

12Rooth (1996, 1999) makes a similar point as he argues that the interpretation of focus in English does not introduce an existential presupposition whereas that of it-clefts does.
To show that the existence implication of aree FCs is a presupposition, in other words, that it is an implication which puts a condition on the context of utterance, I use a standard diagnostic called the *family of sentences* (FoS) test (Chierchia & McConnell-Ginet, 1990; Tonhauser et al., 2013). This test involves checking whether an implication \( m \) of a declarative sentence \( S \) projects, that is, whether it remains an utterance implication of the FoS variants of \( S \) which are the negation of \( S \), the interrogative of \( S \), a modal variant of \( S \), and a conditional with \( S \) as antecedent. In Tonhauser et al. (2013:82-83), an implication \( m \) of a trigger \( t \) is called *projective*, i.e., that it has the potential to project, if it is implied by the FoS variants of \( S \) containing \( t \). In addition, if the implication \( m \) of the trigger \( t \) puts a condition on the context in that it needs to be entailed by the context, then the projection of \( m \) should be tested in contexts that entail \( m \) and those that do not.

As the data below show, the FoS variants of (111) are judged acceptable when the CG entails the existence implication as in (114a-d) and unacceptable otherwise. This shows that the existence implication associated with aree FCs is projective.

(114) Context: Same as (111’).

a. (Maria asks another teacher who is present and knows about her class:)

   **Are** Aree a Raul k’o jun u-kematz’ib’?
   FOC CLF Raul exist one E3-computer
   ‘Is it RAUL who has a computer?’

b. Xaqri **aree** a Raul k’o jun u-kematz’ib’.
   perhaps FOC CLF Raul exist one E3-computer
   ‘Perhaps it is RAUL who has a computer.’

c. We **aree** a Raul k’o jun u-kematz’ib’, in 0-w-eta’m che k-0-u-koj
   if FOC CLF RAUL exist one E3-computer I A3-E1-know COMP ICP-A3-E3-use
   k-0-u-b’an etz’anem.
   ICP-A3-E3-do game
   ‘If it’s RAUL who has a computer, I’m sure he uses it for playing games.’

d. (Another teacher who’s present and knows about Maria’s class says that Raul has a com-
   puter and Maria says:)

66
Aree=t a Raul k’o jun u-kematz’ib’. Aree a Roberto.
FOC=NEG CLF Raul exist one E3-computer FOC CLF Roberto
‘It isn’t RAUL who has a computer. It is ROBERTO.’

Since the existence implication is both a projective implication and a constraint on context, I analyze it as a presupposition. Thus, an aree FC of the form Aree F P, where F stands for the focused expression and P for the expression whose denotation is the property under discussion, presupposes that there is an (possibly plural) individual with property P. Equivalently, we can say that an aree FC is anaphoric to an antecedent with the property under discussion, which makes an aree FC an anaphoric construction.13

Having shown that the interpretation of aree FCs gives rise to an existence implication, I turn to motivate the related claim that an aree FC, as an anaphoric construction, is used to further specify the antecedent it is anaphoric to, which the speaker considers to be insufficiently specified. I also review some previous claims in the literature on it-cLEFTs and show that they do not hold for the interpretation of aree FCs.

To further illustrate the properties of aree FCs, consider the data below which show that the way that an aree FC specifies its antecedent may not always be as fine-grained as giving a name or a

13Pollard & Yasavul (in press) note that English it-cLEFTs can be divided into two distinct types. The first one is where the post-focus constituent is accented and cannot be elided as exemplified in (ii). Prince (1978:898) termed such it-cLEFTs “informative presupposition it-cLEFTs” as the meaning of the post-focus constituent typically provides new information.

(ii) It was Gore Vidal who said “It is not enough to succeed. Others must fail.”

The second type of it-cLEFTs, namely anaphoric it-cLEFTs, is where the post-focus constituent is de-accented or elided as exemplified in (iiiB) and (ivB).

(iii) A: Someone once said “It is not enough to succeed. Others must fail.”

B: Yeah, it was Gore Vidal.

(iv) A: Who said “It is not enough to succeed. Others must fail”?

B: It was Gore Vidal.
group of names. Rather, the speaker may provide coarse-grained information (Ginzburg, 1995a) to the best of her knowledge as in (115b). This may happen because, for example, the speaker thinks that the name of the individual is not relevant for the goals of the asker or that she simply does not know or remember the name of the individual. In (115c), on the other hand, the speaker knows the relevant individuals by name but doesn’t remember which one of them took the last tamale.

(115) Context: Maria comes back from the kitchen and sees that the last tamale she had left on the table is gone. She asks (115a). (115b,c) are possible answers.

a. Chin x-∅-u-k’am b‘i k‘isb’al sub’?
   who CMP-A3-E3-take DIR last tamale
   ‘Who took the last tamale?’

b. Aree jun chi-k-e ri ak’al-ab’ ema k-na’taj=t chi-w-e chin
   FOC one PREP-E3P-GEN DET child-PL but ICP-remember=NEG PREP-E1-GEN who
   ‘It was one of the kids but I don’t remember which.’

c. Aree a Raul, aree al Roberto ema k-na’taj=t chi-w-e chin
   FOC CLF Raul FOC CLF Maria but ICP-remember=NEG PREP-E1-GEN who
   ‘It was Raul or Maria but I don’t remember which.’

In (116b), the speaker provides information about who came, predicating of it the property of being somebody that the addressee doesn’t know.

(116) Context: Raul hears footsteps out in the yard. He later asks Roberto, who was outside, (116a). (116b) is a possible answer.

a. Chin x-∅-pet-ik?
   who CMP-A3-come-SS
   ‘Who came?’

b. Aree (k’o) jun che ∅-aw-eta’m=t u-wach.
   FOC exist one COMP A3-E2-know=NEG E3-face
   ‘It was somebody that you don’t know.’

In (117b) and (117c), the aree FC is used to specify an antecedent by revising misinformation about it.
(117) Context: Raul and his friend Roberto are watching two cats (one black, one white) in their yard. Roberto says (117a). Raul says (117b) or (117c).

a. X-θ-aw-il-o? Ri saq me’s x-θ-u-chap jun tz’ikin. CMP-A3-E2-see DET white cat CMP-A3-E3-catch one bird ‘Did you see? The white cat caught a bird.’

b. K-θ-in-b’ij in che aree ri q’eq x-θ-u-chap-o. ICP-A3-E1-say I COMP FOC DET black CMP-A3-E3-catch-SS ‘I think it’s the black one that caught it.’

c. K-θ-in-b’ij in che aree jun pepe x-θ-u-chap-o. ICP-A3-E1-say I COMP FOC one butterfly CMP-A3-E3-catch-SS ‘I think it’s a butterfly that it caught.’

In (118), there are two potential antecedents for the aree FC to pick up: the shop that was robbed as in (118B) or the robber(s) as in (118B’) whose existence is entailed since a robbery took place.

(118) A: Did you hear? A shop was robbed last night!

B: Aree u-k’ayb’al (sutaq) a Mario. FOC E3-shop CLF Mario ‘It was Mario’s shop.’

B’:Aree in-xb’al e-q’ab’arel. FOC E1-brother A3P-drunk ‘It was my drunken brothers.’

In (119), the context provides more than one potential description for the antecedent that the aree FC identifies as Mario’s dog, e.g., that tipped over the garbage can, that made this mess, etc.

(119) Context: When Raul and Juana get back to their place, they see that the garbage can is on the floor and the trash is all over the place. Mario, their neighbor, has a dog that always tips over their garbage can and makes a mess. Juana says that the place looks like a mess and Raul says:

Aree u-tz’i’ a Mario. FOC E3-dog CLF Mario ‘It was Mario’s dog.’
The examples we have seen so far, in particular (117), (118) and (119), show that modeling the meaning of the *aree* FC requires allowing it to be able to pick a salient and plausible antecedent, which is a fundamentally pragmatic process. As I argue below, this antecedent corresponds to a question, technically to the discourse referent (DR) introduced by an accepted question, when *aree* FCs are used to respond to such questions. I also claim that an exhaustivity implication is relevant only in cases where an *aree* FC is used to reply to a constituent question in which case its antecedent, under the neo-Hamblinian analysis I propose, is entailed to be maximal with respect to the property in question. However, in general, the antecedent that an *aree* FC is anaphoric to does not have to be entailed to be maximal with respect to some property. This observation is supported by the data in (120) where the *aree* FC is not used to reply to a question but rather to specify the gift that Raul brought, for which an antecedent is already made available.\textsuperscript{14}

(120) Context: Maria and Juana are talking about their friend Raul who recently went to the nearby town. Maria says (120a) and Juana says (120b).

a. A Raul x-θ-u-b’ij che x-θ-u-k’am lo jun sipanik ch-aw-e.
   CLF Raul CMP-A3-E3-say COMP CMP-A3-E3-take DIR one gift PREP-E2-GEN
   ‘Raul said that he brought you a gift.’

b. Jee’, *aree* kab’ / jun puwi’ (x-θ-u-k’am lo-q).
   yes FOC candy one hat CMP-A3-E3-take DIR-SS
   ‘Yes, it was candy / a hat (that he brought).’

Based on the examples above, I turn to a discussion of some of the relevant claims in the literature. One of those claims is made in Can Pixabaj & England 2011 and it is about *aree* FCs. As I mentioned above, Can Pixabaj & England (2011:21) claim that *aree* FCs have a cleft-like meaning and classify them under the heading of “contrastive” focus. In my reading of their paper, they also\textsuperscript{14}With respect to the so-called exhaustivity implication, the point I am making here is based on the hypothesis that an *aree* FC is used to further specify an already existing DR—in the case of (120), the DR for Raul’s gift for Juana. On top of this further specification of the antecedent, it seems like it doesn’t add anything more if we said that that DR is also the only DR with the relevant property. In other words, there doesn’t seem to be a need to invoke a notion of exhaustivity implicated by the use of the *aree* FC since the antecedent isn’t entailed to be maximal with respect to some property under discussion. See Pollard & Yasavul in press for similar observations for *it*-clefts in English.
seem to imply that aree FCs can only be used with definite nominals. But as (115b), (116b), (117c), and (120b) show such a requirement does not exist.

Next, I discuss two claims about it-clefts in Velleman et al. 2012 and argue that they do not hold for aree FCs. In their analysis of it-clefts in English, Velleman et al. (2012:442) describe it-clefts as “inquiry terminating (IT) constructions.” An IT-construction is claimed to mark an answer to the current question under discussion as a maximal answer and, as a result, to resolve the question and terminate it as an active line of inquiry. Note that examples like (115b) and (115c) above show that aree FCs do not have such a property (and neither do their it-cleft counterparts in English as I discuss later on). Depending on the goals of the asker of (115a), (115b) and (115c) may be taken as identifying “the tamale-taker” to the best of the speaker’s knowledge but this may not necessarily sufficiently answer the question and terminate it as an active line of inquiry. This fact is further exemplified in (121) where, as far as Juan is concerned, the question is not resolved with what Raul says.

(121) Context: There is a party and every guest brings something to eat. Juan sees tortillas on the table and asks who brought them. Raul says (121a) and Juan says (121b).

   a. Aree jun u-ajtijoxel al Maria.
      FOC one E3-student CLF Maria
           ‘It was a student of Maria’s.’

   b. Chin chi-k-e?
      who PREP-E3P-GEN
           ‘Which one?’

The second claim about it-clefts that Velleman et al. (2012:449) make is that it-clefts require a question to have been raised or discussed. Furthermore, they propose that the existence presupposition of an it-cleft is triggered by the question it answers (Velleman et al., 2012:456). However, as (117b) and (117c) above exemplify, aree FCs do not necessarily require a question to be under discussion in prior discourse. More precisely, the antecedent to be picked up by an aree FC does not necessarily have to be introduced by an implicit question or by an interrogative in prior discourse. In (117), one can assume that this antecedent is made available given what Roberto says in (117a).
As a result, the meaning of an aree FC does not have to make reference to a question (implicit or otherwise), not only because the existence presupposition is already independently satisfied but also because making reference to a question in the meaning of the construction is not necessary.

Having discussed the existence implication of aree FCs and argued for a particular analysis of their interpretation, I turn to a discussion of the exhaustivity implication of aree FCs which, I claim, only arises when they are used to reply to constituent questions.

### 3.3.2 Exhaustivity implication of aree FCs

The second implication that distinguishes aree FCs from answer FCs can be called an exhaustivity implication, following much of the previous work on the interpretation of it-cleft/focus movement constructions, e.g., in English and Hungarian (É. Kiss, 1998). For it-cleft/focus movement constructions, it has been claimed that an exhaustivity implication amounts to identifying the entity denoted by the focused expression as the only (or maximal) entity bearing the property under discussion (among others, Horn, 1981; Szabolcsi, 1981; Roberts, 1998; Percus, 1997; É. Kiss, 1998; Krifka, 2008; Büring, 2011; Velleman et al., 2012). There is a considerable amount of discussion in the literature as to how to characterize and classify this implication. Here, I exemplify it in K’iche’ first before I discuss and argue against previous analyses of this phenomenon and propose an alternative account that explains why it arises. To illustrate, consider the data in (122), which show a contrast between the two focus constructions in K’iche’.

(122) Context: Raul and Roberto are talking about an exam that Raul had taken that has just been graded. He says that the teacher gave a piece of candy to those who got 100%. Roberto asks (122a) and Raul says (122b). The follow-ups in (122b) are unacceptable with (122c).

a. Chin x-∅-k-esaj juntir utz?
   who CMP-A3-E3P-get all good
   ‘Who got 100%?’
b. A Juan r-ichb’il al Maria. ø-w-eta’m taj we k’o jun chik. / Al Juana clin Juan E3-companion clin Maria A3-E1-know NEG if exist one another clin Juana xuquje’.
   too
   ‘Juan and Maria. I don’t know if anyone else did. / Juana did, too.’

c. Aree a Juan r-ichb’il al Maria. #ø-w-eta’m taj we k’o jun chik. /#Al foc clin Juan E3-companion clin Maria A3-E1-know NEG if exist one another clin Juana xuquje’.
   Juan too
   ‘It was Juan and Maria. I don’t know if anyone else did. / Juana did, too.’

As (122b) shows, with an answer FC it is possible for the speaker to not know whether someone else other than Juan and Maria got 100%, or to use an additive particle like xuquje’ ‘too’ to add another individual to the plurality of people who got 100%. However, as (122c) shows, using an aree FC precludes these possibilities. The question, then, is why the two constructions behave differently.

As I discuss in detail in the next section, most of the literature on constructions similar to aree FCs, e.g., *it*-clefts in English or Hungarian preverbal focus, claimed that their interpretations involve an only-type meaning, which in turn would explain the exhaustive reading that such constructions appear to have. Can Pixabaj & England (2011) make a similar claim for K’iche’ when they say “contrastive” focus constructions, those which they claim operate like *it*-clefts in English, require either aree ‘FOC’ or xow ‘only’ preceding the focused expression. However, aree ‘FOC’ and the translational equivalent of only in K’iche’ are not interchangeable as (123) shows.15

(123) Context: Raul is a new teacher at the primary school. He knows the people in the village but doesn’t yet know who the parents of each of his students are. At a meeting, he asks Roberto, his fellow teacher, (123a) and Roberto says (123b).

a. Chin u-tat al Maria?
   who E3-father clin Maria
   ‘Who is Maria’s father?’

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15The consultants I worked with used the variant xiw ‘only’ instead of xow.
b. **Aree** Carlos.
   
   FOC  Carlos
   ‘It is Carlos.’

c. **#Xiw** Carlos.
   only Carlos
   ‘Only Carlos.’

Further evidence for the claim that *aree* ‘FOC’ and *xiw* ‘only’ are not interchangeable comes from considering their behavior in the context of singular and plural constituent questions. With a singular constituent question, using *xiw* ‘only’ is not acceptable whereas using *aree* ‘FOC’ is, as (124) shows. The opposite is the case when the question is a plural constituent question as in (125). This contrast also shows that the question in (124) implicates that exactly one individual got 100% which is why using *xiw* ‘only’ is infelicitous.

(124) Chin tijoxel  x-Ø-r-esaj  juntir utz?
   who  student  CMP-A3-E3-get all  good
   ‘Which student got 100%?’

   a. (**Aree**) a  Raul.
      FOC  CLF Raul
      ‘(It is) Raul.’

   b. **#Xiw** a  Raul.
      only CLF Raul
      ‘Only Raul.’

(125) Chin tijoxel-ab’ x-Ø-k-esaj  juntir utz?
   who  student  CMP-A3-E3P-get all  good
   ‘Which students got 100%?’

   a. (**#Aree**) a  Raul.
      FOC  CLF Raul
      ‘(It is) Raul.’

   b. **Xiw** a  Raul.
      only CLF Raul
      ‘Only Raul.’

In the next section, I first discuss previous analyses of the exhaustivity implication of *it*-clefts, a much-discussed construction similar to the *aree* FC in K’iche’, and why those analyses are not
appropriate. Then I propose an alternative analysis where the exhaustivity implication arises as a by-product of the fact that the antecedent that the construction (*aree FC or *it-cleft) is anaphoric to in the context of a constituent question is maximal with respect to the property under discussion. I argue that the maximality is contributed by the meaning of the question, which obviates the need to analyze the exhaustivity implication as part of the meaning of *aree FCs or *it-clefts.

### 3.3.3 Previous analyses of the exhaustivity implication of *it-clefts

As mentioned in the previous section, it is traditionally claimed that *it-clefts identify the denotation of the focused expression as the only or the maximal entity with the relevant property, hence the so-called exhaustivity implication (among others, Horn, 1981; Szabolcsi, 1981; Roberts, 1998; Percus, 1997; É. Kiss, 1998; Krifka, 2008; Büring, 2011; Velleman et al., 2012).

The exhaustivity implication was analyzed as an assertion by Bolinger (1972); Halvorsen (1978); Atlas & Levinson (1981); Szabolcsi (1981) and Han & Hedberg (2008). However, Horn (1981) argued that this analysis is problematic for English. In particular, if exhaustivity was asserted, then one wouldn’t expect (126a) to be infelicitous but rather pattern like (126b), because the cleft would be informative (examples adapted from Horn 1981).

(126) a. #I know John went to SALT but I’ve just heard it was John who went to SALT.

   b. I know John went to SALT but I’ve just heard only John went to SALT.

Horn (1981) claimed that the exhaustivity implication should rather be analyzed as a conversational implicature. According to his analysis, the existence presupposition of an *it-cleft, together with what an *it-cleft asserts, gives rise to the implication that the individual denoted by the focused expression is the only relevant individual with the property under discussion. The exhaustivity implication then follows from a quantity implicature, because if there were other individuals with the same property, the speaker would have mentioned them. The problem with this analysis, as Velleman et al. (2012) note, is that this implicature cannot be directly canceled as shown in (127).

(127) #It was John who went to SALT; indeed, it was John and Bill.
A third line of analysis claims that the exhaustivity implication is a presupposition (Kenesei, 1986; Szabolcsi, 1994; Percus, 1997; Bende-Farkas, 2006a; Hedberg, 2013). In some presuppositional analyses, e.g., Percus 1997; Bende-Farkas 2006a and Hedberg 2013, the similarities between cleft-like structures and definite descriptions are exploited, building on the idea that clefts conceal a discontinuous definite description, and equating the exhaustivity implication with the uniqueness (or maximality) presupposition of this definite description. In some of these analyses, the exhaustivity implication of a cleft like (128) is captured by employing a universal quantifier as in (128a) and in yet others it is captured by the iota operator as in (128b).

\[(128) \begin{align*}
\text{It was John who went to SALT.} \\
\text{a. } & \forall x \text{ (went-to-SALT}(x) \rightarrow (x = j)) \\
\text{b. } & j = \iota x \text{ went-to-SALT}(x) \\
\text{c. } & \exists x \text{ went-to-SALT}(x) \\
\text{d. } & \text{went-to-SALT} (j)
\end{align*}\]

Velleman et al. (2012) point out that the analyses of exhaustivity that employ (128a) are problematic because taken together with an existence presupposition like (128c), they entail (128d), the implication which is taken to be the asserted content.\(^\text{16}\) Consequently, the use of a cleft is predicted to be uninformative in contexts where these presuppositions are part of the CG or are accommodated, despite the fact that clefts do not sound redundant in such contexts. Moreover, (128a) does not seem to survive under negation as examples like (129) are perfectly fine.

\[(129) \text{It wasn’t John who went to SALT. It was Bill.}\]

As I mentioned before, the interpretation of exhaustivity in it-clefts is usually taken to involve a counterpart of only. Velleman et al. (2012:442) note that the idea that clefts and only-sentences are semantically similar has resulted in analyses where the two are claimed to have the same exhaustive meaning component. The difference, as they note, was captured by claiming that only-sentences assert, while clefts presuppose or conventionally implicate, exhaustivity.

The formal account that Velleman et al. (2012:442) propose, where they describe it-clefts as “inquiry terminating (IT) constructions”, is similar to the previous accounts in the literature which

\(^\text{16}\)Note that in the analysis I propose, the asserted content is not (128d) but rather something along the lines of (128b).
draw on the idea that the apparent exhaustivity in *it*-clefts is similar to that of *only*. Velleman et al. use the two meaning components MIN and MAX given in (130) to characterize *only* and CLEFT<sub>S</sub>, their cleft operator responsible for the exhaustivity implication of a cleft. Here, the subscript S indexes the current context which includes a Current Question under discussion<sup>17</sup> (CQ<sub>S</sub>) and a salient partial ordering over the alternatives in CQ<sub>S</sub>, indicated by the entailment relations<sup>18</sup> (≥<sub>S</sub>) and (>_<sub>S</sub>). In particular, p ≥<sub>S</sub> q iff p entails q, and p ><sub>S</sub> q iff p entails q and p is distinct from q.

\[
\text{(130) a. MIN}_S(p) = \lambda w. \exists q \in CQ_S[q(w) \land (q \geq_S p)]
\]

“There’s a true answer at least as strong as p.”

\[
b. \text{MAX}_S(p) = \lambda w. \forall q \in CQ_S[(q >_S p) \rightarrow \neg q(w)]
\]

“No true answer is strictly stronger than p.”

(Velleman et al., 2012:451)

According to Velleman et al., clefts and *only*-sentences differ in their meaning because what is at-issue for CLEFT<sub>S</sub>, namely, (130a), is presupposed for *only*, and what is at-issue for *only*, namely, (130b), is presupposed for CLEFT<sub>S</sub>. Consequently, they assign (131a) to *only* and (131b) to CLEFT<sub>S</sub>. The two meaning components are separated by a dot as follows: presupposed.asserted. Given (131b), Velleman et al. would derive the exhaustivity in (128) as follows. The MIN component asserts that there’s a true answer at least as strong as (128d), and the MAX component requires that there is no answer stronger than (128d), and as a result one infers that John went to SALT and nobody other than John did.

\[
\text{(131) a. } \text{[only]} = \lambda w. \lambda p: \text{MIN}_S(p)(w) . \text{MAX}_S(p)(w)
\]

b. CLEFT<sub>S</sub> = \lambda w. \lambda p: \text{MAX}_S(p)(w) . \text{MIN}_S(p)(w)

(Velleman et al., 2012:452)

Velleman et al.’s analysis of *it*-clefts runs into the same problems I pointed out in the previous section based on the data on *aree* FCs. First, an *it*-cleft doesn’t have to resolve a question and

<sup>17</sup>The term Current Question (CQ) is used to refer to the question at the top of the QUD-stack in the sense of Roberts 1996/2012.

<sup>18</sup>These relations may include pragmatic ordering alongside pure entailment (Beaver & Clark, 2008).
terminate it as an inquiry. For example, depending on the goals of the querier in (132), the clefts in (132a-c) may be taken as identifying “the cookie-taker” to the best of the cleft-utterer’s knowledge but this may not sufficiently answer the question for it to be popped out of the QUD-stack.

(132) Who took the last cookie?
   a. It wasn’t one of the kids.
   b. It was one of the kids but I don’t remember which.
   c. It was John or Mary but I don’t remember which.

Furthermore, *it*-clefts can be used in contexts where there is no sense in which they terminate an inquiry as (133) illustrates. Here, A does not provide the identity of the International Relations professor who took the 3 slices of pizza perhaps because she thinks B wouldn’t be interested or that B wouldn’t know the professor or perhaps A herself doesn’t know the identity of the the professor either (Pollard & Yasavul, in press).

(133) A: It turns out, it was one of the International Relations professors who took the last 3 slices of pizza in the lounge!
   B: Which one?

As I noted previously, Velleman et al. (2012:449) also claim that *it*-clefts require a question to have been raised or discussed. They propose that the existence presupposition of a cleft is triggered by the question it answers (Velleman et al., 2012:456). However, an *it*-cleft in English doesn’t require a question to be under discussion in prior discourse. In (134), for example, there is no need to assume that given what A says the question *Who robbed the BP station?* gets onto the QUD-stack. Rather, in (134a), the speaker B chooses an antecedent, namely the one for the robber(s), since the existence of that antecedent is inferable from the existence of a robbery, and identifies it with the denotation of the post-copular NP. The fact that (134b), the short answer counterpart of (134a), is infelicitous in this context casts further doubt that the cleft in (134a) is an answer to a question. In (134c), the speaker B chooses another antecedent, namely the one for the gas station.
An exhaustivity inference does not arise because the CG does not entail that the antecedents are maximal with respect to some property; the cleft just picks up an antecedent to further specify it.

(134)  A: A gas station near Bethel and River Road was robbed last night!

    B:a. It was my two halfwit brothers (who robbed it).

          b.#My two halfwit brothers.

          c. It was the BP station (that was robbed).

A related example from The Simpsons, discussed in Pollard & Yasavul in press, is given in (135).\(^{19}\) This excerpt is from one of the Halloween episodes where Mr. Burns is a vampire and the Simpsons are visiting his mansion. The it-cleft in (135d) falsely identifies the utterer of Homer’s first sentence with the denotation of the focused expression the boy, namely Bart. Observe that alongside (135d), (135e) is also possible as a reply. However, its non-cleft counterpart in (135f) is not, which suggests that there isn’t a salient question that is being answered in this context. Since (135d) is felicitous, in Velleman et al.’s approach, where it-clefts make reference to salient questions, an implicit question would have to be accommodated. The point of the contrast between (135d) and (135f) is that if (anaphoric) it-clefts were genuine answers (with additional implications not necessarily found in non-cleft answers) and did make reference to salient questions, it would equally be expected that answers like (134Bb) or (135f) have access to such questions, too. After all, accommodation of the implicit question is due to the presuppositional nature of answers. Consequently, if Velleman et al. were right in their claim that it-clefts are answers to questions, they would have to explain why it would be possible to accommodate a question for an it-cleft answer but not for its non-cleft counterpart.

(135)  a. Lisa: Dad, do you notice anything strange?

          b. Homer: Yeah, his hairdo looks so queer.

          c. Vampire Burns: I heard that!

d. Homer: It was the boy!

(Compare)

e. Homer: It wasn’t me!

f. Homer: #Not me!

Going back to the meaning in (131b) that is assigned to clefts, note that MINS(p) is actually p. Velleman et al. already note that $p \models \text{MINS}(p)$ or, in other words, $p \subseteq \text{MINS}(p)$. The fact that $\text{MINS}(p) \subseteq p$ follows from the definition of $\text{MINS}(p)$ and the fact that worlds are closed under entailment. So, in (128) for example, the asserted content would be (128d) which is the same as what most of the previous accounts claimed it to be. On the other hand, MAXS(p) will be truth-conditionally equivalent to the proposition If John went to SALT, then nobody else did. This is the same conditional presupposition that Büring (2011) proposed for it-clefts except that Velleman et al. claim that the meaning of clefts are focus sensitive in that they make reference to the current QUD. Either way, such a presupposition seems unnecessary. For instance, for (136a) to be felicitous, it is not necessary neither for the speaker to assume (136b) to be mutually known, nor for the hearer to know or to accommodate it.

(136) Who came to see you last night?

a. It was somebody that you don’t know.

b. ps: (?) If somebody that the addressee doesn’t know came, then nobody else did.

Lastly, a Velleman et al.-style exhaustivity account cannot be extended to cases like (132c). To say that (132c) presupposes that no true answer is strictly stronger than the proposition (took-last-cookie(j) ∨ took-last-cookie(m)) is false because (132c) entails that there is a true answer which is strictly stronger than this disjunction, namely whichever disjunct is true.

In the next section, I propose an alternative analysis of the so-called exhaustivity implication where it arises as an epiphenomenon, namely as a result of aree FCs or it-clefts being used to reply to constituent questions. As such, I deny that an exhaustivity implication is part of the meaning of
aree FCs/it-clefts. The analysis that this claim is based on incorporates the original ideas about the analysis of questions in Hamblin 1957 and Hamblin 1971, and captures the implications associated with answers, which I discuss subsequently.

3.3.4 A neo-Hamblinian analysis of questions and answers

Recall that in §3.2.1, I argued that an aree FC gives rise to an existence presupposition in the sense that an aree FC requires that there be an individual in the context with the relevant property. In this section, I claim that the contrast between (122b) and (122c), which are repeated below in (137b) and (137c), arises because the antecedent in the context of the question in (137a) is the maximal plurality of individuals with the property of getting 100%. The aree FC identifies this plurality with the denotation of the focused expression, hence the infelicity of the sentences following the aree FC in (137c).

(137) Context: Raul and Roberto are talking about an exam that Raul had taken that has just been graded. He says that the teacher gave a piece of candy to those who got 100%. Roberto asks (137a) and Raul says (137b). The follow-ups in (122b) are unacceptable with (137c).

a. Chin x-∅-k-esaj juntir utz?
   who CMP-A3-E3P-get all good
   ‘Who got 100%?’

b. A Juan r-ichb’il al Maria. θ-w-eta’m taj we k’o jun chik. / Al Juana
   CLF Juan E3-companion CLF Maria A3-E1-know NEG if exist one another CLF Juana
   xuquje’.
   too
   ‘Juan and Maria. I don’t know if anyone else did. / Juana did, too.’

c. Aree a Juan r-ichb’il al Maria.#∅-w-eta’m taj we k’o jun chik. /#Al
   FOC CLF Juan E3-companion CLF Maria A3-E1-know NEG if exist one another CLF
   Juana xuquje’.
   Juana too
   ‘It was Juan and Maria. I don’t know if anyone else did. / Juana did, too.’

To see why the answers in (137) are about the maximal plurality of individuals who got 100%, we need to understand the context in which (137b) and (137c) are uttered and, in particular, what
the question they are answers to contributes to the context after it is accepted. To that end, I adopt
two ideas from Hamblin 1957 and Hamblin 1971 for the analysis of questions which form the basis
of the formal analysis of questions and answers I propose.

Hamblin (1957) claims that (i) a question denotes a set of propositions, its possible answers (the
so-called “Hamblin alternatives”), (ii) possible answers are together exhaustive, and (iii) possible
answers are mutually exclusive. Thus, such answers are complete in the sense that each possible
alternative precludes all of the others. For example, in the case of a who-question, one obtains an
alternative for each particular choice of a maximal plurality of people with the property in question.
Then, the corresponding possible answer, defined by the three criteria above, says that that plurality
is the maximal one with the property in question. Put differently, the possible answers to, say, Who
left? are the different propositions of the form \( X \) is the maximal plurality of people who left, where
\( X \) is a maximal plurality. For example, in a universe of discourse consisting of just three individuals
Juan, Maria, and Carlos, we can construct the plurality containing the three atoms (Juan, Maria,
and Carlos), the pluralities containing two atoms (Juan and Maria; Juan and Carlos; and Maria and
Carlos), as well as the singular pluralities containing a single atom (Juan; Maria; and Carlos). Therefore, a possible answer (in the sense of a Hamblin alternative) does not necessarily correspond
to an imaginable way to reply to a question and, of course, actual replies to interrogative speech acts
that count as answers are not required to fully express a Hamblin alternative.

In addition, Hamblin (1971:134) defines what he calls the presumption of a question as “equiv-
alent to the disjunction of its answers.” The disjunction of the possible answers of a question is
equivalent to an existential quantification on the set of its possible answers. Since possible answers
are complete and mutually exclusive, the presumption of a question requires not only existence but
the unique existence of a true complete answer. Hamblin (1971:148) suggests that the asker of a
question and, in the case of acceptance, all the interlocutors, are committed to the presumption of
the question. In the dynamic analysis of questions I elaborate later on, this would have the effect of

\[\text{As I discuss in more detail in §3.4.3, the set of pluralities forms a join-semilattice with the null plurality, corresponding to the Nobody (slept) answer, being the least element.}\]
adding the presumption of the question into the CG and thereby making available a DR for the max-
imal plurality of individuals with the property in question for subsequent reference. In other words,
an accepted question introduces a DR into the context and answers are analyzed as anaphoric to this
DR. This is the way in which the anaphoricity of answers to questions is captured in the analysis.

Since possible answers are complete, a who-question like (137a) is taken as asking for the maxi-
mal plurality of individuals with the property of getting 100%. Upon acceptance of the question, the
interlocutors become committed to answering it (Roberts, 1996/2012), which, in the current setup,
involves specifying the maximal plurality. Given this effect of (137a) on the context, the contrast
between (137b) and (137c) arises because in (137c) the aree FC identifies the maximal plurality of
individuals with the property of getting 100% with the entity denoted by the focused expression21
whereas no such identification necessarily exists in (122b), because I analyze non-aree answers as,
in general, providing only partial information about the identity of the maximal plurality in ques-
tion. Put differently, (137b) says that Juan and Maria are two atoms of the maximal plurality of
individuals with the property of getting 100% whereas (137c) says that that maximal plurality is the
plurality with the two atoms Juan and Maria. Therefore, it is unacceptable in (137c) to continue
by saying that one doesn’t know whether there are other individuals that belong to this plurality or
that this plurality contains another atom, namely the one for Juana, whereas no such unacceptability
arises in the case of (137b).

In sum, the exhaustivity implication is derivable from the two properties of aree FCs when
they are used to reply to a constituent question: (i) an aree FC takes as antecedent the maximal
plurality of individuals with the property in question, which in turn is supplied by the meaning of
the question, and (ii) it identifies this plurality with the denotation of the focused expression. I will,
therefore, not analyze this implication as part of the meaning of aree FCs.22

21This is similar to É. Kiss’s (2006) claim that the Hungarian preverbal focus position is a predicative position and the
exhaustivity is a result of specificational predication.
22Similarly, Pollard & Yasavul (in press) do not analyze the exhaustivity implication as part of the meaning of it-clefs
in English.
In general, the analysis I propose yields a simpler theory for aree FCs and it-clefts (and possibly for similar constructions discussed in the literature, e.g., Hungarian preverbal focus) where exhaustivity is not encoded in the meaning of the construction. The analysis also obviates the need to identify whether this putative implication is a presupposition, a conversational implicature, a conventional implicature, etc., a much discussed topic especially in the literature on it-clefts, as I discussed in the previous section.

As for the previous analyses of focus constructions in K’iche’, the differences in the interpretations of the two focus constructions I discussed were either overlooked (e.g., Larsen, 1988; Trechsel, 1993) or not explicitly shown to be the case (Can Pixabaj & England, 2011). Moreover, that answer FCs and aree FCs differ in their interpretations, namely that the former does not give rise to existence or exhaustivity implications, goes against the standard assumption that focus constructions in Mayan are interpreted like it-clefts across the board.

Having shown how the neo-Hamblinian analysis of questions and answers provides an alternative way to explain the exhaustivity implication, I turn to elaborate more on the implications associated with answers and how they are rendered in the current analysis.

### 3.3.5 Implications associated with answers

In the dynamic analysis I proposed, the anaphoricity of an answer to a question is captured by analyzing answers as anaphoric to DRs introduced by questions. To be able to interpret an answer, hearers have to be able to retrieve the question being answered since an answer is anaphoric to, or presupposes, that question. I take this presupposition to be non-controversial since it is tantamount to saying that an answer requires that the question it answers be retrievable by the hearer(s), i.e., that the speaker commits herself that the hearer(s) can figure out which question is being answered. In the context in (226) below, where the question has just been asked, the speaker may likely not provide a long answer, where she would use the overt continuation\(^\text{23}\) (the property expressed by the

---
\(^\text{23}\)See de Groote 2001b; Barker 2002 and Barker 2004, among others, for the use of continuations in the analysis of natural language.
lambda abstract of the question with its question word replaced by a variable), which corresponds to got 100% in (226c). She would rather use the corresponding short answer in (226b) where such a continuation is not overt. I say that the implication that an answer is anaphoric to a question is non-controversial since it is evident that uttering, say, (226b) in a context where the corresponding question in (226a) either has not been asked or cannot be retrieved even when the long answer in (226c) is used would result in utter perplexity on the part of the hearer(s).

(138) a. Who got 100%?
   
   b. `RAUL.'
   
   c. `RAUL got 100%.'

Pragmatically, a difference between long and short answers is that with long answers, the speaker intends the hearer(s) to be able to do the retrieval without difficulty in cases where using the short answer would make the retrieval difficult or even impossible. To illustrate, consider (139). In the scenario described in (139), (139B3) and (139B4) are infelicitous as answers to (139A) because they do not provide enough information for speaker A to figure out which question is being answered. Short answers like (139B3) and (139B4), where the continuation of the question word is elided, are presumably the most natural way of providing answers for a scenario where the question is just asked and hence the anaphora is easy to resolve because the question is salient enough.

(139) Speaker A asks (139A) but speaker B doesn’t remember at the time of the conversation who the person was that brought the letter. Speaker B answers A's question when he sees A later in the day with (139a) or (139b). (139c) and (139d) are infelicitous in such a scenario.

A: Who brought the letter on my desk?

B1: John brought the letter.

B2: It was John who brought the letter.

B3: #John.

B4: #It was John.
A second implication that I mentioned above has to do with what an answer proffers. In the literature on answers, it is commonplace to assume that, say, (138b) and (138c) mean the same thing. For example, Merchant (2004), in his influential analysis on short answers to questions, claims that at some level of representation, answers like (138b) are just like (138c) but part of their phonology is suppressed either by deletion or silencing. In Merchant’s analysis, short answers are generated as parts of sentential constituents and the short answer or “fragment” portion of the sentence undergoes movement to a clause-peripheral position before ellipsis applies. The input to the semantic component is the same in both types of answers and it is thus predicted that they mean the same thing. Merchant (2004:662) claims that in an alternative, non-ellipsis analysis of short answers, one must either allow non-sentential syntactic structures to denote propositions or non-propositional semantic objects they give rise to to be able to be used to make assertions. According to Merchant, such a move would require “a revision of the systems of form-meaning mappings” (2004:663), or enriching “the pragmatic interpretive component” (2004:771).

Yet, there is no reason to assume that grammar only treats sentences as units and that it cannot assign meaning to non-sentential expressions when such expressions are used to make assertions. Crucially, as Stainton (2005:387) points out, the issue is not about merely uttering a word or a phrase to communicate a proposition but rather uttering it in a pragmatically appropriate context that triggers the search for a proposition. In fact, one of the most apparent examples of a pragmatically appropriate context is the very case of question-answer pairs that Merchant provides his ellipsis analysis for. A question-answer pair forms a discourse unit because of the anaphoric dependency of the answer to the question, and one can model this anaphoric dependency without necessarily complicating the grammar as Merchant envisions. In such an analysis, non-sentential expressions, e.g., words or phrases, would have their own syntax and semantics, and they would be neither sentential nor propositional. But there will also be fully propositional speech acts, e.g., the speech act of answering a question, that the interlocutors perform with those non-sentential expressions.24

24See Stainton 2005, 2006 and Elugardo & Stainton 2004 for arguments against an ellipsis analysis of various examples of non-sentential expressions used to make speech acts.
In the current analysis, not only do the short and long answers not mean the same thing, but also neither of them has the meaning generally assumed in the literature. For example in (226b), since what is asserted is not the proposition that Raul got 100% but rather that Raul is in the maximal plurality with the property of getting 100%, the implication that Raul got 100% follows indirectly. I believe that this is a welcome result especially since, contrary to what an ellipsis analysis claims, we actually do not know a priori what the string means unless we know what question it answers. A short answer only yields a meaning with respect to the question it answers. This is also true for the listener since she does not have access to the deleted/unpronounced material (Jacobson, 2016).25 Rather, she has to construct the meaning in the context of the question. In the current analysis, this is captured in a way that the proffered content of the answer makes explicit reference to the question it answers. As for the long answer, a related point is that the sentence Raul got 100% uttered out of the blue is only an assertion. However, when it is uttered as an answer to Who got 100%?, the fact that it answers the question, i.e., that there is a speech act of answering, is part of its meaning. The current analysis captures this fact, too, since being an answer is encoded in the meaning that is assigned to both long and short answers, as we will see in the next section.

Finally, the answers in (226b) and (226c) have the implication that Raul is in the (implicit) domain restriction of the question determined by the context of utterance. For example, if the conversation is about the students in a class, then Raul is one of them. For a wh-question whose domain restriction is explicit, Hamblin (1973:51) writes that “When someone answers “What dog walks with Mary?” with “Rover”, he states not merely that Rover walks with Mary, but also implicitly that Rover is a dog, and hence . . . he states the conjunction.” Although, Hamblin is right in that the speaker implicitly conveys that Rover is a dog, this implication of the answer does not have the same status as the implication that Rover walks with Mary. Note, for example, the negative counterpart of the answer, namely “Not Rover” still implicates that Rover is a dog but not that Rover walks with Mary. As such, the implication that Rover is in the domain restriction of the question does project

25I return to this point in §3.4.3 where I compare the neo-Hamblinian analysis I propose to some prominent theories of questions and answers.
under negation and is not the main point, i.e., not at-issue. Therefore, following Karttunen & Peters (1979), I analyze this implication as a conventional implicature (CI).

In what follows, I make the simplifying assumption that answerhood in K’iche’ has the same properties or, in other words, that the interpretation of an answer in K’iche’ gives rise to the same implications as its counterpart in English.

3.4 K’iche’ fragment: focus constructions

In this section, I turn to developing a formal grammar fragment of K’iche’ in DyCG which captures the analysis of answer focus constructions. I first elaborate the dynamic context model in DyCG, which I introduced in Chapter 2, in order to be able to capture the dynamic meaning of questions and answers. Then, I provide an analysis of basic declarative sentences in K’iche’ in the extended setup before moving onto the analysis of answer and aree focus constructions.

3.4.1 Contexts in the extended DyCG framework

It has been suggested that an adequate model of context needs to include a way to keep track of questions that are uttered in discourse and capture the interpretation of their answers (among others, Ginzburg, 1994, 1995a,b; Roberts, 1996/2012, 2004; Zeevat, 2007; Farkas & Bruce, 2009).26 In this section, I extend the DyCG context model introduced in chapter 2 in order to provide a dynamic analysis of questions and answers in K’iche’.

Elaborating the DyCG context model, I model contexts as functions from n-tuples of semantic objects to an ordered pair. The first component of the ordered pair is a (static) proposition, the common ground (CG), and its second component is a stack of (some of) the semantic objects in the n-tuple. The second component of a context is called the topics under discussion (TUD) stack. The TUD-stack is similar to the QUD-stack (Ginzburg, 1994; Roberts, 1996/2012; Farkas & Bruce, 2009).

26 A much richer model of context would include ways to keep track of acceptances and rejections of discourse moves, speaker commitments, etc.
(2009) in the sense of keeping track of accepted questions in discourse. However, such questions are not stored as sets of propositions as in the QUD-stack but rather push onto the TUD-stack a DR for which further identification is sought (more on this in §3.4.3 and §3.5).

In (140), I provide an example context where the CG only consists of the proposition that there is a donkey that brays and there are no topics under discussion, which is indicated by \[
\]. Note that this is the exact same context in the DyCG setup in chapter 2 except for the addition of the second component in the body of the abstract, which, in this particular case, is empty.

(140) \(\lambda x. \langle (\text{donkey } x) \text{ and } (\text{bray } x), [] \rangle\)

The context in (140) is equivalent to the one in (141) which uses vector notation. In (141), the superscript 1 on the tuple variable \(x\) gives the length of the tuple and the tuple variables (here, just \(x_0\)) are subscripted.

(141) \(\lambda x^1. \langle (\text{donkey } x_0) \text{ and } (\text{bray } x_0), [] \rangle\)

In the extended system, the type of \(c_n\) of \(n\)-ary contexts is defined similarly to the type of \(n\)-ary contexts without a TUD-stack. In particular, the new type for \(n\)-ary contexts is given in (142). As in chapter 2, the type of \(n\)-ary contexts is defined using a dependent product type, a generalization of function types, where the type of the value depends on the argument. As before, the reason to use dependent typing for contexts is due to the fact that depending on \(n\), the context \(c_n\) will be of a different type. Here, I use subvect \(v\) for the type of subvectors of \(v\).\(^{27}\) The type \(s\) is the disjoint union of all types of semantic objects to which anaphoric reference is possible. In particular, in the extended setup, the semantic objects in the argument tuple are not necessarily of type \(e\), but can also be of type pluralities (\(e^\#\)), propositions (\(p\)), etc.

(142) \(c_n =_{\text{def}} \Pi_{v^s \cdot p \times \text{subvect } v}\)

The type \(c\) of contexts should subsume all the \(n\)-ary contexts, for every natural number \(n\). Thus, \(c\) is defined as in (143). This is the dependent sum of \(c_n\) as \(n\) ranges over natural numbers. It denotes

\(^{27}\)A subsequence is to a sequence as a subvector is to a vector.
a disjoint union of a family of sets which is itself indexed by the members of another set (here, the natural numbers).

\[(143)\ c = \text{def} \sum_{n \in \mathbb{N}}.\ c_n = \Sigma_{n \in \mathbb{N}}.\ \Pi_{\nu \in \mathbb{N}}.\ p \times (\text{subvect}\ \nu)\]

The dynamic meanings of declarative and interrogative sentences are modeled as functions from contexts to contexts. Thus, they are both of type \(k : c \rightarrow c\). By way of example, the dynamic meaning of \(A\ farmer\ danced\) is given in (144). In (144), \(c : c\) is the utterance context, where \(c\) is the type of contexts. The superscript \(|c|\) on \(x\) is the arity of \(c\), namely the number of DRs that \(c\) is about. \(y^1\) is the length-one vector for the DR introduced by the indefinite \(a\ farmer\). The first component of the tuple in (144) gives the proffered content of the utterance and the second component is empty since the utterance does not have an effect on the TUD-stack.

\[(144)\ \lambda_{c \cdot \mathbb{N}}.\ \langle (\text{farmer} \ y_0)\ \text{and}\ (danced \ y_0), [\ ] \rangle\]

Once an utterance is accepted, its context update is obtained by applying to its dynamic meaning the \(cc\) function given in (145). Note that this is an extended version of the \(cc\) function from chapter 2 since now we take into consideration the updates of both declarative and interrogative sentences. In (145), the first component of the ordered pair in the body of the abstract is obtained by conjoining the carryover from the input context \(c\) with the conjunct which is jointly determined by \(c\) and the proffered content \(k\). The second component adds to the TUDs of the input context the TUDs coming from updating the context with the accepted utterance.

\[(145)\ cc = \text{def} \lambda_{\mathbb{N} \cdot \mathbb{N}}.\ \langle \lambda_{c \cdot \mathbb{N}}.\ \langle \pi_1 (c \ x)\ \text{and}\ \pi_1 (k \ c \ x, y),\ \text{push}\ \pi_2 (k \ c \ x, y)\ \pi_2 (c \ x) \rangle \rangle\]

To illustrate the update of a declarative sentence in the extended setup, suppose we want to update a given context with \(A\ farmer\ danced\) whose dynamic meaning is given in (144). Given (144) and (145), the context update of \(A\ farmer\ danced\) is given in (146).

\[(146)\ \lambda_{c \cdot \mathbb{N}}.\ \langle \pi_1 (c \ y)\ \text{and}\ (\text{farmer} \ x_0)\ \text{and}\ (\text{danced} \ x_0),\ \text{push}\ [\ ]\ \pi_2 (c \ y) \rangle\]

Applying this update, say, to the context in (141) yields (147).
(147) \( \lambda x^2. \langle (\text{donkey } x_0) \text{ and } (\text{bray } x_0) \text{ and } (\text{farmer } x_1) \text{ and } (\text{danced } x_1), [ ] \rangle \)

After these preliminaries about the change in the structure of contexts in DyCG, I turn to an analysis of basic declarative sentences in K’iche’.

### 3.4.2 Analysis of basic declarative sentences in K’iche’

In this section, I begin constructing the K’iche’ fragment starting with an analysis of basic declarative sentences. To that end, I begin with the sign for the proper name \( a \text{ Raul} \) ‘Raul’ in (148a). In the pheno of (148a), \( f : s \to s \). In the tecto, QP abbreviates \( (\text{NP} \to S) \to S \), the tecto type of generalized quantifier NPs which look for an expression of type \( \text{NP} \to S \) to yield an expression of type \( S \). In the semantics, \( RAUL : (n \to k) \to k \) abbreviates the dynamic meaning of the proper name \( A \text{ Raul} \) ‘Raul’ given in (148b). In (148b), \( D : n \to k \) is a variable for a dynamic property and \( c : c \) for a context. As discussed in chapter 2, following Martin (2013:111), I analyze proper names such that in (148b), for example, the DR (the NAMED-RAUL \( c \)) is the unique DR that is entailed by the context to have the property of being named Raul.

(148) a. \( \vdash \lambda f. (f \text{ araul}) \); QP ; RAUL

b. \( RAUL =_{\text{def}} \lambda D, \lambda c, D \text{ (the NAMED-RAUL } c) \ c \)

A second sign is given in (149a). In the pheno of (149a), \( s : s \). In the tecto, \( \text{NP} \to S \) says that the verb \( xwar \) ‘s/he slept’ is looking for an NP to yield an \( S \). In the semantics, \( \text{SLEEP} : n \to k \) is the dynamic meaning of the verb \( xwar \) ‘s/he slept’ given in (149b). In (149b), \( n : n \) is a variable for a DR and \( c : c \) for a context. The static property sleep is applied to the \( n \)-th component of the tuple variable \( x \) and the input context \( c \) is required to ‘know about’ this DR which is indicated by \( c > n \).

(149) a. \( \vdash \lambda x. xwar \cdot s \); NP \( \to S \); SLEEP

b. \( \text{SLEEP} =_{\text{def}} \lambda n, \lambda c : c > n, \lambda x^c. \langle \text{sleep} x_n, [ ] \rangle \)

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28 For sake of simplicity, I analyze the proper name \( Raul \) together with its classifier \( a \text{ ‘CLF’}. \)

29 Recall that in Martin 2013, the function \( \text{the} \) maps a dynamic property and a context to a DR.
Given (148a) and (149a), the derivation of (150) is given in (151). The intermediate steps of the proof in (151), e.g., \( \beta \)-reduction, are provided in (152) and (153).

(150) \( x\)-\( \emptyset \)-war a Raul.
    CMP-A3-sleep CLF Raul
    ‘Raul slept.’

(151) \[ \vdash \lambda_f.(f\,\text{raul}) \quad ; \quad \text{QP} \quad ; \quad \lambda_x.x\text{war} \cdot s \quad ; \quad \text{NP} \rightarrow S \quad ; \quad \text{SLEEP} \]

\[ \vdash x\text{war} \cdot \text{raul} \quad ; \quad S \quad ; \quad \text{RAUL SLEEP} = \lambda_c.c \rightarrow (\text{the NAMED-RAUL } c) \quad \lambda_{x[1]} \cdot \langle \text{sleep } x(\text{the NAMED-RAUL } c), [1] \rangle \]

The phenogrammatical derivation in (151) is given in (152). Here, the pheno of the proper name applies to that of the verb to yield the string \( x\text{war} \cdot \text{raul} \). In the tecto, QP applies to \( \text{NP} \rightarrow S \) to yield an expression of type \( S \). In the semantics, the dynamic meaning of the proper name applies to the dynamic meaning of the verb. The semantic derivation is given in (153). Note that \((\text{the NAMED-RAUL } c)\) is the DR which indexes the entity of the argument tuple that is entailed by the context to bear the property of being named \textit{Raul}.

(152) \[ \lambda_f.(f\,\text{raul})[\lambda_x.x\text{war} \cdot s] = \lambda_x.x\text{war} \cdot s \ (\text{raul}) \]

\[ = x\text{war} \cdot \text{raul} \]

(153) \[ \text{RAUL SLEEP} = \lambda_c.c \rightarrow (\text{the NAMED-RAUL } c) \]

\[ = \lambda_c.(\lambda_{d[1]}(\text{the NAMED-RAUL } c) \quad \langle \text{sleep } x(\text{the NAMED-RAUL } c), [1] \rangle) \]

Next, I provide the analysis of a sentence with a transitive verb, namely the one in (154). For this analysis, I add two more lexical items to our current lexicon which are given in (155). The first one, (155a), is for the verb \textit{xuto’} whose dynamic meaning is given in (155b). The second lexical entry is for the object argument of the verb in (154) which is not overtly realized. Here, I am making use of phonologically null pronouns.

(154) \( x\)-\( \emptyset \)-u-to’ a Raul.
    CMP-A3-E3-help CLF Raul
    ‘Raul helped her.’
Given the lexical entries in (155) and the one for a Raul ‘Raul’ in (148), the derivation of (154) is given in (156).

In (156), the verb first combines with a trace for the O argument and then with a trace for the A argument. After these steps, the O trace is discharged via HP and the phonologically null O argument takes scope. Next, the A trace is discharged via HP and the A argument takes scope, yielding the full sentence.

Having illustrated the analysis of basic declarative sentences in K’iche’, I move on to a discussion of the details of the neo-Hamblinian analysis of questions and answers.
3.4.3 A neo-Hamblinian dynamic analysis of questions and answers

As outlined in §3.3.4, the analysis of questions and answers I propose is a dynamic adaptation of the ideas in Hamblin 1957 and Hamblin 1971. In particular, the analysis builds on (i) how Hamblin originally defined questions, and (ii) his notion of the presumption of a question. In this neo-Hamblinian dynamic analysis, an accepted question introduces a DR into the context which is concomitantly made into a topic and pushed onto the TUD-stack. Answers are analyzed as anaphoric to this DR, as I discuss in detail below.

Recall that although Hamblin is always cited as claiming that a question denotes the set of its possible (propositional) answers, he also defined such answers in a certain way. In Hamblin 1957, a question and its possible answers are defined as follows: (i) a question denotes a set of propositions, its possible answers. (ii) possible answers are together exhaustive. (iii) possible answers are mutually exclusive. Thus, such answers are complete in the sense that each possible alternative precludes all of the others. For a who-question, for example, we obtain an alternative for each particular choice of a maximal plurality with the property in question. Thus, a who-question is taken as asking for the maximal plurality with the property in question.

Formally, the question word who is defined (statically) as in (158). Here, I distinguish between types e (entities) and e# (pluralities of entities); X and Y range over the latter. In general, for a given sense type A, A# is the type of plurality of A’s. A plurality may be null or may be singular. In particular, the set of pluralities forms a join-semilattice such that for any two pluralities A and B, A ⊑ B if and only if the set of atoms of A is a subset of the set of atoms of B. The null plurality is the least element of the set of pluralities. A singular plurality is any plurality with a single atom.

I also define the function #A : (A → p) → (A# → p) in (157) which maps properties of A’s to (distributive) properties of pluralities of A’s. Thus, for example, given a property P of type p1 = e → p, P# is the corresponding distributive property of pluralities of type e# → p. The variable Z ranges over properties of pluralities.

(157) \[ P# =_{def} \lambda X. \forall x. (x \text{ atom-of } X) \implies (P x) \], where \( P : A \rightarrow p \) for some sense type A

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I also define the operation maximizes\textsubscript{A} : (A\textsuperscript{♯} → p) → A\textsuperscript{♯} → p on properties of pluralities which is axiomatized as in (159), where \(|\cup|\) of a set of pluralities \(S\) is the semilattice join of \(S\), i.e., the plurality whose set of atoms is the union of the sets of atoms of the pluralities in \(S\). The idea here is that \(X\) maximizes \(Z\) at a world \(w\) iff \(X\) is maximal among all \(Y\) such that \((Z \ Y) \ @ \ w\).\textsuperscript{30} Thus, (maximizes \(Z \ X\)) is the proposition that the plurality \(X\) is the maximal plurality with property \(Z\).

(158) \(\text{who} =_{\text{def}} \lambda_{Z; e^\# \to p}. \lambda_{p; p}. \exists_{X; e^\#}. p\) equals \((\text{maximizes}_e (\lambda_{Y; e^\#}. (\text{person}_e \ Y)) \text{ and } (Z \ Y)) \ X\)

(159) \(\forall_{X; Z; w}. (\text{maximizes}_A Z \ X) \ @ \ w \leftrightarrow X = (\cup \lambda_{Y}. (Z \ Y) \ @ \ w)\)

As a result of the definitions in (158) and (159), a constituent question like \(\text{Who slept?}\) gets the (static) meaning in (160) which captures the intended meaning of the question, namely that it is asking for the maximal plurality that slept. Note that sleep\textsubscript{♯} is of type \(e^\# \to p\).

(160) \(\text{who sleep} = \lambda_{p}. \exists_{X; e^\#}. p\) equals \((\text{maximizes} (\lambda_{Y; e^\#}. (\text{person}_e \ Y)) \text{ and } (\text{sleep}_e \ Y)) \ X\)

More generally, (static) question meanings are defined based on the family of functions given in (161) which is of type \((A^\# \to p) \to p \to p\), where \(A\) is a sense type.

(161) \(\text{WH}_A =_{\text{def}} \lambda_{Z; A^\# \to p}. \lambda_{p; p}. \exists_{X; A^\#}. p\) equals \((\text{maximizes} Z \ X)\)

Based on (161), we can define who, (plural) which, and a polar question operator, whether, as in (162a), (162b), and (162c), respectively. Note that in (162), that\textsubscript{e} is of type \((e^\# \to p) \to (e^\# \to p)\) and is defined as in (163a). On the other hand, in (162c), that\textsubscript{p} is of type \((p^\# \to p) \to (p^\# \to p) \to (p^\# \to p)\) and is defined as in (163b).

(162) a. which \(=_{\text{def}} \lambda_{R; e^\# \to p}. \lambda_{Z; e^\# \to p}. \text{WH}_e (R \text{ that}_e Z)\)

b. who \(=_{\text{def}} \text{which person}_e\)

\textsuperscript{30}Recall that the constant @\textsubscript{A} of type \(A \to w \to \text{Ext}(A)\), where \(A\) is a sense type, is the function that maps a sense of type \(A\) and a world \(w\) to the extension of \(A\) at \(w\). For \(a : A, a @ A w\) is read as ‘the extension of \(a\) at \(w\)’. In the particular case here, where \(A\) is \(p\), \(p @ w\) can be read as ‘\(p\) is true at \(w\)’ or ‘the truth value of \(p\) at \(w\)’.
c. whether $=_{\text{def}} \lambda_p \cdot \text{WH}_p \left( \text{fact} \# \left( \text{that} p \# \text{equals} p \right) \right)$
   
   $= \lambda_p, \lambda_q \cdot \exists X : p \# \cdot q \text{equals} \left( \text{maximizes} \left( \text{fact} \# \left( \text{that} p \# \text{equals} p \right) \right) X \right)$

(163) a. that$_{c#} =_{\text{def}} \lambda_{R,c^* \rightarrow p} \lambda_{Z,c^* \rightarrow p} \lambda_{X,c^*} \cdot (R X) \text{ and } (Z X)$

b. that$_{p^*} =_{\text{def}} \lambda_{U,p^* \rightarrow p} \lambda_{V,p^* \rightarrow p} \lambda_{W,p^*} \cdot (U W) \text{ and } (V W)$

c. fact$_{#} =_{\text{def}} \lambda_{p,p^*} \cdot p$

Recall that the Hamblin presumption of a question $q$ is the proposition that exactly one of $q$’s alternatives is true. For example, the Hamblin presumption of the question Who slept? is given in (164) which is equivalent to (165), where I eliminate $!$, since the maximal $X$ is necessarily unique.

(164) exists!$_p \cdot p$ and exists$_X \cdot (p \text{equals} \left( \text{maximizes} \left( \lambda_Y \left( \text{person}_# Y \right) \text{ and } \left( \text{sleep}_# Y \right) \right) \right) X)$

(165) exists$_X \cdot \text{maximizes} \left( \lambda_Y \left( \text{person}_# Y \right) \text{ and } \left( \text{sleep}_# Y \right) \right) X$

Since $X$ might be the empty plurality, (165) is a necessary truth. However, in the current dynamic adaptation of Hamblin’s ideas, the dynamic counterpart of (165), the dynamic Hamblin presumption (DHP) of the question, introduces a new DR corresponding to $X$. The DHP, which is added to the CG after acceptance,\(^{31}\) expresses that the DR $X$ is the maximal satisfier of the property in question. Thus, the dynamic semantics of an accepted question is an update function which conjoins its DHP to the CG of the input context, and pushes the corresponding DR on top of the TUD-stack so that it becomes the current topic. This encodes the commitment of the discourse participants to (sufficiently) specify this DR.

Before moving onto the analysis of answer FCs in K’iche’, I discuss how the dynamic meanings of questions are defined in DyCG and how we obtain their context update. First, I define the dynamic version of maximizes in (166). Here, $c_{>n,A^*}$ is the type of contexts of arity greater than $n$ whose $n$-th DR is of type $A^*$, where $A$ is a sense type. The vector $x[x_n/Y]$ is obtained from the vector $x$ by replacing its $n$-th component with $Y$. Thus, $\text{MAXIMIZES}_A$ takes a dynamic property of pluralities $D$ and returns a dynamic property of maximizing $D$.

\(^{31}\)Recall that the Hamblin presumption becomes a commitment of the interlocutors after the question is accepted.
(166) \[ \text{MAXIMIZES}_A = \lambda_D, \lambda_n, \lambda_{c, n, A^\\circ} \cdot (\text{maximizes} (\lambda_X : A^\\circ \cdot \pi_1(D \in c X[x_n / Y])) x_n, [\_]) \]

Next, I define the function \((\cdot)^2\) which takes a dynamic property of pluralities and has the effect of pushing the \(n\)-th DR of the input context on top of the TUD-stack.

(167) \[ (\cdot)^2 = \text{def} \lambda_D, \lambda_n, \lambda_{c, n, A^\\circ} \cdot (\pi_1(D \in c X), \text{push } x_n \pi_2(D \in c X)) \]

By using the definitions in (166) and (167), I define \(\text{MAXIMIZES}_A^2\) in (168) which is used in the dynamic meaning of questions. \(\text{MAXIMIZES}_A^2\) has the effect of maximizing a dynamic property of pluralities and pushing the DR for the maximizer on top of the TUD-stack.

(168) \[ \text{MAXIMIZES}_A^2 = \text{def} \lambda_D, (\text{MAXIMIZES}_A D)^2 \]

Finally, using the definition in (168), I define the dynamic counterparts of the (plural) which, who, and whether in (169a), (169b), and (169c), respectively. \(^{32}\) Observe that the definition in (169a) embodies the often-noted close relationship between interrogative words and indefinites (e.g., Baker, 1968; Haspelmath, 1997; Bhat, 2000).

(169) a. \(\text{WHICH}_A = \text{def} \lambda_D, \lambda_E \cdot \text{EXISTS} (\text{MAXIMIZES}_A^2 (D \in c E)) \)

b. \(\text{WHO} = \text{def} \text{WHICH}_c \text{ PERSON}#\)

c. \(\text{WHETHER} = \text{def} \lambda_K, \text{WHICH}_p \text{ FACT}# (\text{EQUALS } K)#\)

Based on the definitions above, the content of the question Who slept? is given in (170). As desired, the content of the question has its Hamblin presumption in the first component of the body of the abstract and the maximizer DR in the second component. By using the \text{cc} function defined in (145), the update of the question will have the effect of conjoining its Hamblin presumption to the CG and pushing on top of the TUD-stack the DR for the maximal plurality of individuals with the property of sleeping.

\(^{32}\) I will use \text{WHETHER} in the analyses of broad and narrow focus polar questions in chapter 5.
WHO SLEEP

= WHICH e PERSON SLEEP

= EXISTS (MAXIMIZES \( e \) (PERSON \( e \) THAT SLEEP))

= EXISTS (MAXIMIZES \( e \) (PERSON \( e \) THAT SLEEP))

= \( \lambda_x. (\text{MAXIMIZES}_e (\text{PERSON}_e \text{ THAT SLEEP}_e))^2 \) \( |c|^c \)

= \( \lambda_x. (\text{MAXIMIZES}_e (\text{PERSON}_e \text{ THAT SLEEP}_e))^2 \) \( |c|^c \)

Having discussed the neo-Hamblinian dynamic analysis of questions, I now turn to the analysis of long answer FCs in K’iche’.

3.4.4 Analysis of long answer FCs in K’iche’

Within the dynamic analysis of questions and answers developed above, a long answer FC in K’iche’ is formed via the lexical entry for the long answer focus (laf) construction given in (171).

(171)  

\[ \text{laf} =_{def} \lambda q. \lambda f. q (\lambda s. s) \cdot (f e) ; \]

\[ \text{QP} \to \text{NP} \to S \to F ; \]

\[ \lambda Z. \lambda Y. Z (\lambda s. \lambda e. \lambda c. (\text{MAXIMIZES}_e \text{ PERSON}_e \text{ THAT SLEEP}_e)) \cdot (\text{the MAXIMIZES}_e \text{ PERSON}_e \text{ THAT SLEEP}_e) \]

In the pheno of laf, \( q : (s \to s) \to s \) stands for the pheno of the pre-predicate expression and \( f : s \to s \) for that of its continuation. These variables are fed \( \lambda s. s \) and \( e \), respectively, to turn them into strings. In the tecto, laf takes the focused expression (type QP) and its continuation (type NP \( \to S \)) as arguments to yield an expression of type F, the basic type of focus sentences. In the semantics of laf, \( Z \) stands for the dynamic meaning of the focused expression and \( Y \) for its continuation. \( n \) and \( c \) are variables for a DR and a context, respectively. In the body of the abstract, notice the expression \( x_n \subseteq \text{the MAXIMIZES}_e \text{ PERSON}_e \text{ THAT SLEEP}_e \) which is the asserted content of the answer. The interpretation of this expression relies on two facts. First, as I noted above, the set of pluralities form a join-semi lattice.
such that $A \sqsubseteq B$ if and only if the atoms of $A$ is a subset of the atoms of $B$. The partial order $\sqsubseteq_{\text{nn}}$, where the subscript ‘nn’ abbreviates non-null, requires both $A$ and $B$ to be non-null pluralities.\footnote{Since the null plurality is always a member of the maximal plurality, non-null membership ensures that the felicitous answer \textit{Nijun xwarik} ‘Nobody slept’ to (172a) below would not come out as false. The answer \textit{Nijun xwarik} ‘Nobody slept’, once applied to a context, would add to the CG the proposition that there is no plurality of persons such that it is a non-null member of the maximal plurality that slept. From this, it follows that the only plurality that is a member of the maximal plurality is the null plurality and consequently the maximal plurality is the null plurality. Without the non-null membership restriction, the answer would be saying something false because the null plurality is always a sub-plurality of the maximal plurality.}

Second, the expression $x(\text{the (MAXIMIZES } Y \text{) c})$ is the DR which is introduced by the question from among the DRs that are on the TUD-stack. Recall that this DR is the maximal satisfier of the property denoted by the continuation. Thus, the continuation, which is elided in the case of short answers, is used to pick up the relevant DR in the analysis of long answers. This is the way in which \textit{laf} explicitly encodes the anaphoricity of an answer to an accepted question in discourse.

Given the lexical entry in (171) and the entry for the verb \textit{xwarik} ‘s/he slept’ in (173),\footnote{Here, I make the simplifying assumption that there is a lexical entry of the verb \textit{war} ‘sleep’ in the lexicon together with the corresponding phrase-final suffix. In a more adequate fragment, we would need to take into consideration the distribution of the phrase-final suffix \textit{-ik} ‘SS’.
} the analysis of the answer in (172b) is given in (174). The meaning of the answer comes out as Raul is a non-null member of the maximal plurality of people that slept or, equivalently, $x(\text{the (NAMED-RAUL } c) \sqsubseteq_{\text{nn}} x(\text{the (MAXIMIZES SLEEP} \# \text{) c})$.

\begin{enumerate}
\item (172) a. Chin x-Ø-war-ik?
\hspace{1cm} \text{who CMP-A3-sleep-SS}
\hspace{1cm} ‘Who slept?’
\item \hspace{0.5cm} b. Raul x-Ø-war-ik.
\hspace{1cm} CLF Raul CMP-A3-sleep-SS
\hspace{1cm} ‘RAUL slept.’
\end{enumerate}

\begin{enumerate}
\item (173) $\vdash \lambda_x.\text{xwarik} \cdot s; \text{NP} \rightarrow o \ ; \text{SLEEP} \#$
\end{enumerate}
(174) \[ \vdash \lambda_q. \lambda_f. \, (q \lambda_s.s) \cdot (f \, e) ; \]
\[ \lambda_Z. \lambda_Y. \, Z \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x_n \sqsubseteq \text{nn} \, x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) ; \]
\[ \vdash \lambda_q. (g \, \text{aul}) ; \]
\[ \lambda_Z. \lambda_Y. \, Z \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x_n \sqsubseteq \text{nn} \, x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) \]

(175) \[ \lambda_q. \lambda_f. \, (q \lambda_s.s) \cdot (f \, e) \]
\[ = \lambda_f. \, (\lambda_q. \, g \, \text{aul})(\lambda_s. \, s) \cdot (f \, e) \]
\[ = \lambda_f. \, (\lambda_s.s \, \text{aul}) \cdot (f \, e) \]
\[ = \lambda_f. \, \text{aul} \cdot (f \, e) \]

The phenogrammatical derivation in the second MP step is given in (176), which combines the preverbal part of the sentence with the rest of the sentence.

(176) \[ \lambda_f. \, \text{aul} \cdot (f \, e) \, [\lambda_s. \, (x \text{warik} \cdot s)] \]
\[ = \text{aul} \cdot (\lambda_s. \, x \text{warik} \cdot s \, e) \]
\[ = \text{aul} \cdot x \text{warik} \]

Finally, the semantic derivations corresponding to the two steps in (175) and (176) are given in (177) and (178), respectively.

(177) \[ \lambda_Z. \lambda_Y. \, Z \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x_n \sqsubseteq \text{nn} \, x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) \]
\[ = \lambda_Y. \, \text{aul} \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x_n \sqsubseteq \text{nn} \, x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) \]
\[ = \lambda_Y. \, \lambda_f. \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x_n \sqsubseteq \text{nn} \, x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) \]
\[ = \lambda_Y. \, \lambda_f. \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) \]
\[ = \lambda_Y. \, \lambda_f. \, (\lambda_n. \lambda_c. \lambda_{\chi[x]} \cdot \langle x_n \sqsubseteq \text{nn} \, x \text{(the (MAXIMIZES Y) c)} \rangle \rangle) \]

100
Having illustrated how long answer FCs are analyzed, I turn to the analysis of short answer FCs.

3.4.5 Analysis of short answer FCs in K’iche’

Short answer FCs in K’iche’ are formed via the lexical entry for the short answer focus (saf) constructions given in (179). There are two important differences between saf and laf defined in (171). The first is that the former does not take the post-focal part of the sentence as argument. The second difference is that the short answer is anaphoric to the DR on top of the TUD-stack.

\[
\begin{align*}
\text{(179)} \quad & \quad \text{saf} = \text{def} \vdash \lambda q \cdot (q \lambda z \cdot \lambda n \cdot \langle x_n \sqsubseteq \text{nn} \cdot \langle \text{top} (\pi_2(c \cdot x)) \rangle, [] \rangle) \quad \text{F} \\
& \quad \lambda Z \cdot Z \cdot \langle x_n \sqsubseteq \text{nn} \cdot \langle \text{top} (\pi_2(c \cdot x)) \rangle, [] \rangle)
\end{align*}
\]

In the pheno of saf, \( q : (s \rightarrow s) \rightarrow s \) stands for the pheno of the focused expression. This variable is fed \( \lambda z \cdot \lambda n \cdot \langle x_n \sqsubseteq \text{nn} \cdot \langle \text{top} (\pi_2(c \cdot x)) \rangle, [] \rangle \) to turn it into a string. In the tecto, saf takes the focused expression (type QP) as argument to yield an expression of type F. In the semantics of saf, Z stands for the dynamic meaning of the focused expression. \( n \) and \( c \) are variables for a DR and a context, respectively. The fact that the short answer FC is anaphoric to the topmost DR on the TUD-stack is captured by the expression \( x_n \sqsubseteq \text{nn} \cdot \langle \text{top} (\pi_2(c \cdot x)) \rangle \). This expression says that \( x_n \), which is going to correspond to the entity denoted by the focused expression, is a non-null member of the topmost DR on the TUD which is picked up by \( \text{top} (\pi_2(c \cdot x)) \). Note that in the lexical entry for laf the antecedent DR is picked up via \( x_{(\text{MAXIMIZES Y})} \cdot c \cdot x \) rather than directly by \( \text{top} (\pi_2(c \cdot x)) \). This difference is intended to capture the intuition that with a long answer, i.e., by providing the continuation of the focused expression, one can refer to a question that is not necessarily on top of the TUD-stack (recall the discussion of short vs. long answers in §3.3.5).

Given the lexical entry in (179), the derivation of the short answer in (180b) is provided in (181). Intuitively, the meaning we obtain for the short answer says that \( x_{(\text{MAXIMIZES Y})} \cdot c \cdot x \), which
corresponds to the entity denoted by the focused expression a Raul ‘Raul’, is a non-null member of the topmost DR on the TUD-stack.

(180) a. Chin x-θ-war-ik?
   who CMP-A3-sleep-SS
   ‘Who slept?’

b. A Raul.
   CLF Raul
   ‘RAUL.’

\[ \begin{align*}
\lambda_x. (q \lambda_s. s); & \quad \quad \lambda_f. (f \text{ araul})
\end{align*} \]

\[ \begin{array}{c}
\lambda_Z. Z (\lambda_n. \lambda_c. \lambda_{\chi[d]} \cdot \langle x_n \sqsubseteq_{\text{nn top}} (\pi_2(c\ x)), [\ ]] \}) \\
\lambda_{c:d>(\text{the NAMED-RAUL } c)} \cdot \lambda_{\chi[d]} \cdot \langle x(\text{the NAMED-RAUL } c) \sqsubseteq_{\text{nn top}} (\pi_2(c\ x)), [\ ] \rangle
\end{array} \]

In the tecto, saf applies to the focused expression, which is of type QP, to yield an expression of type F. The corresponding phenogrammatical derivation is given in (182).

(182) \[ \lambda_q. (q \lambda_s. s) [\lambda_f. (f \text{ araul})] = (\lambda_f. f \text{ araul})(\lambda_s. s) \]

= \lambda_s. s araul

= araul

Finally, (183) provides the semantic derivation in (181).

(183) \[ \begin{align*}
\lambda_Z. Z (\lambda_n. \lambda_c. \lambda_{\chi[d]} \cdot \langle x_n \sqsubseteq_{\text{nn top}} (\pi_2(c\ x)), [\ ] \}) & \text{ RAUL} \\
= \text{ RAUL} (\lambda_n. \lambda_c. \lambda_{\chi[d]} \cdot \langle x_n \sqsubseteq_{\text{nn top}} (\pi_2(c\ x)), [\ ] \}) \\
= \lambda_{d:\langle(\text{the NAMED-RAUL } d) \rangle} \cdot (\lambda_n. \lambda_c. \lambda_{\chi[d]} \cdot \langle x_n \sqsubseteq_{\text{nn top}} (\pi_2(c\ x)), [\ ] \}) \\
= \lambda_{d:>(\text{the NAMED-RAUL } c)} \cdot \lambda_{\chi[d]} \cdot \langle x(\text{the NAMED-RAUL } c) \sqsubseteq_{\text{nn top}} (\pi_2(c\ x)), [\ ] \rangle
\end{align*} \]

Having illustrated how short answer FCs are analyzed, I turn to the analysis aree FCs.
3.4.6 Analysis of *aree* FCs in K’iche’

Recall that in §3.3, I argued for an analysis of *aree* FCs/it-clefts where they are used to specify an antecedent DR which the speaker considers to be insufficiently identified. In addition, I hypothesized that the so-called exhaustivity implication is not part of the meaning of *aree* FCs/it-clefts since, in general, the contexts where these constructions can be felicitously used do not entail that the antecedent DR is maximal with respect to some property. To capture these properties of *aree* FCs, I use the lexical entry given in (184).

\[
\text{aree}_1 \overset{\text{def}}{=} \lambda q. \lambda f. \text{aree} \cdot (q \lambda s. s) \cdot (f \ e) ;
\]
\[
\text{QP} \rightarrow (\text{NP} \rightarrow \text{S}) \rightarrow \text{S} ;
\]
\[
\lambda Z. \lambda Y. Z \ (\lambda n. \lambda c. \lambda x.|\langle x_n \text{ equals } x_{(\text{the } Y c)}\rangle|) \}
\]

In the pheno of *aree*$_1$, $q : (s \rightarrow s) \rightarrow s$ stands for the pheno of the pre-predicate expression and $f : s \rightarrow s$ for that of its continuation. These variables are fed $\lambda q. s$ and $e$, respectively, to turn them into strings. In the tecto, *aree*$_1$ takes the focused expression (type QP) and its continuation (type NP $\rightarrow$ S) as arguments to yield an expression of type S. In the semantics of *aree*$_1$, $Z$ stands for the dynamic meaning of the focused expression and $Y$ for its continuation. $n$ and $c$ are variables for a DR and a context, respectively. In the body of the abstract, the expression ($x_n$ equals $x_{(\text{the } Y c)}$) is the asserted content of the sentence. Here, (the $Y c$) returns the salient insufficiently identified DR which is entailed by $c$ to have the dynamic property $Y$. Note that the lexical entry of *aree* ‘FOC’ neither makes reference to a question nor does it encode some notion of exhaustivity. Rather, for the cases when an *aree* FC takes a DR introduced by a constituent question as antecedent, (the $Y c$) is expected to pick up that salient DR which in turn is entailed to be maximal with respect to the property in question. Given that $x_n$, the entity corresponding to the focused expression, is equated with $x_{(\text{the } Y c)}$, an exhaustivity implication will follow as an epiphenomenon.

Given the lexical entry in (184), the analysis of (185) is given in (186).

\[
\text{aree} \overset{\text{FOC}}{=} \text{Raul} x-\emptyset-\text{war-ik}.
\]
\[
\text{FOC} \text{ CLF Raul CMP-A3-sleep-SS}
\]

‘It was RAUL who slept.’
Next, I turn to an analysis of *aree* FCs where the continuation of the focused expression is not taken as an argument. In this case, the construction does not have access to a property that can be used to pick up the intended DR. Rather, the hearer reasons whichever DR it is, it has to be a DR for something that could consistently be said to be equal to the entity being focused. So, for example, in order to be equated with (the DR for) the person that slept, the focused entity has to be some $x$ such that it is not inconsistent for $x$ to have that property. The expressions ($\text{aree}_c$) is intended to return the salient insufficiently identified DR in $c$ with the relevant property, a process which is left to pragmatics.

\[
\text{aree}_2 = \text{def} \vdash \lambda q.\text{aree} \cdot (q \lambda x.s));
\]

\[
\lambda Z. Z (\lambda q.\text{aree} \cdot (q \lambda x.s)));
\]

Given the lexical entry in (187), the analysis of (188) is given in (189).

\[
\text{(188) Aree a Raul.}
\]

FOC CLF Raul

‘It was RAUL.’

\[
\vdash \lambda q.\text{aree} \cdot (q \lambda x.s);
\]

\[
\vdash \lambda f.\text{araul};
\]

\[
\lambda Z. Z (\lambda q.\text{aree} \cdot (q \lambda x.s)));
\]

In the next section, I turn to a discussion of the neo-Hamblinian analysis of questions and answers.
3.5 Discussion and comparison to other theories

In this section, I discuss some issues with the neo-Hamblinian analysis developed in this thesis, and also compare it with some of the prominent theories about questions and answers.

The neo-Hamblinian analysis is similar to and, in certain respects, improves previous approaches to the question-answer relation, in particular the ones that employ a QUD-stack (Ginzburg, 1994; Roberts, 1996/2012; Farkas & Bruce, 2009). First, note that pushing a DR onto the TUD-stack upon acceptance of a question encodes the commitment of the interlocutors to sufficiently identify this DR. This is essentially analogous to the way in which the discourse update function of questions is analyzed in a QUD-stack-based approach: sufficiently identifying the DR on the TUD-stack corresponds to resolving the question on the QUD-stack (Ginzburg, 1994, 1995a). The difference is in the semantic objects that are kept track of: questions vs DRs introduced by questions.

As a motivation for the current analysis, note that there is independent evidence to assume that question words, e.g., *wh*-expressions, introduce DRs. Cross-linguistically, such expressions are closely related to indefinites (e.g., Baker, 1968; Haspelmath, 1997; Bhat, 2000), and the latter are dynamically analyzed as introducing DRs. In addition, as van Rooy (1998) points out, *wh*-expressions can antecede anaphora similar to indefinites as illustrated in (190), where the *wh*-words are antecedents for the italicized pronouns. Thus, in a dynamic setup, an advantage of the TUD-stack over the QUD-stack is that the DRs that are pushed onto it are already independently needed.

(190) a. Which student broke the window? They are in serious trouble!

b. Who went to Mary’s party? and what did they bring?

c. A: Who went to Mary’s party? B: John was one of them.

Recall that upon acceptance of a question, its Hamblin presumption gets added to the CG which expresses that the DR that is pushed onto the TUD-stack is the maximal satisfier of the property in question. Therefore, analyzing answers as anaphoric to DRs on the TUD-stack automatically (but

35 For formal semantic accounts that treat *wh*-words as indefinites see Karttunen 1977; van Rooy 1998; Kratzer & Shimoyama 2002; Haida 2008; AnderBois 2012.
indirectly) enables access to the continuation of the question word—thanks to the presumption of the question—which a short answer needs to have access to for its interpretation. This is another advantage of the TUD-stack over the QUD-stack since in the latter approach, the answer needs to ‘look inside’ the current QUD, which is stored as a set of propositions, and somehow figure out the continuation.

Alternatively, an approach which employs a QUD-stack may incorporate a Merchant (2004) style ellipsis analysis of short answers. In fact, as Krifka (2001) discusses, any approach where questions are analyzed as sets of propositions, and long answers are taken as basic may incorporate an ellipsis analysis. The point here is that, in these approaches, a short answer can only be understood through a process of reconstructing a full answer (Beaver & Clark, 2008:27). Recall that in an ellipsis analysis, some syntactic process operates on long answers and deletes the material recoverable from the question to yield the short answer. The deleted material would then be interpreted anaphorically in some way. However, such an analysis would face the same problems as Merchant’s ellipsis analysis discussed in detail in Jacobson 2016. In particular, Jacobson argues that (i) most of the syntactic arguments for an ellipsis analysis of short answers, which I will not discuss here, does not go through. In addition, she points out that one of the semantic arguments for an ellipsis analysis, namely that the short answer is “understood” as conveying the same proposition as the long answer, does not go through, either. The reason, Jacobson argues, is that listeners do not have access to deleted material and, consequently, even if one accepts the claim that short and long answers convey the same proposition, an ellipsis analysis does not provide insight into the fact that listeners would have to deduce that proposition in the case of short answers.

Observe that not having access to the question continuation is a general problem in the treatment of the question-answer relation in theories that take long answers as basic, e.g., alternative semantics. Consider, for example, the long answer in (191B) to the question in (191A), ignoring for the time being the fact that the long answer is probably not very natural in this context. In theories based on alternative semantics, focus interpretation requires that the focus semantic value of the
answer be a superset of the denotation of the question.\footnote{Recall that in Roberts’s (1996/2012) analysis, what is required is identity between the focus semantic value of the answer and the denotation of the question. But that requirement is too strong since just by calculating the focus semantic value of the answer one cannot capture the domain restriction contributed by the question.} Although, the focus semantic value of (191B) is indeed a superset of the meaning of (191A), and thus is a congruent answer, there is no clear way in which the meaning of the answer captures the fact that John is in the explicit domain restriction of the question. In other words, the meaning of the answer does not implicate that John is a student. This is because the interpretation of the answer only puts a constraint on the question meaning without having access to it.

(191) A: Which students are subject to the continuous enrollment requirement?

B: \textsc{John} is subject to the continuous enrollment requirement.

As pointed out by Ginzburg (1995a) and van Rooy (2003), among others, the treatment of alternatives as sets of propositional answers is not fine-grained enough to capture a wide array of felicitous responses. In particular, the need to have access to the continuation of the question word has motivated numerous scholars (e.g., Groenendijk & Stokhof, 1984; Ginzburg, 1995a; Krifka, 2001, 2004; van Rooy, 1997; Ginzburg, to appear; Jacobson, 2016) to adopt some version of the so-called \textit{categorial/functional} analysis of questions and answers (Hausser & Zaefferer, 1979), which is also adopted in the structured meanings (SM) approach (Krifka, 2001, 2004), mentioned in §3.1.1. In the categorial/functional analysis, questions are analyzed as functional abstractions. A question word acts as a lambda operator on the corresponding variable and applying the denotation of the question to that of a short answer yields a propositional answer. For example, the question \textit{Who slept?} would denote the function $\lambda x. (\text{slept } x)$ which, when applied to the meaning of the short answer say, \text{\textit{j}} for John, would yield the meaning \text{slept } \text{\textit{j}}. Thus, there is a much closer connection between questions and their answers. One of the criticisms of Krifka (2001) against theories where questions are analyzed as sets of propositions (e.g., Hamblin 1973; Karttunen 1977 and Groenendijk & Stokhof 1984) is that short answers to constituent questions or short answers to polar questions...
cannot be straightforwardly captured. A virtue of the categorial/SM approach is that it captures the question-answer relation directly in the case of short answers.

Note that since questions are treated as functional abstracts, it follows that different questions are assigned different types in the categorial/functional approach. In general, a question with \( n \) wh-words would denote an \( n \)-ary relation. This, however, is a major disadvantage, as has been pointed out by Aloni et al. (2007) and Beaver & Clark (2008), among others, because assigning different types to different questions results in problems with embedding and coordination. In particular, verbs that take complements which denote questions would receive different types depending on what type of question they can embed, compare (192a) and (192b). At the same time, the fact that different questions can be conjoined as in (192c) is not accounted for. Since the current analysis eliminates the need for a functional representation in order to have access to continuations of question words, different questions are not assigned different types, and hence the theory does not suffer from the major disadvantage of the categorial approach and related theories.

(192) a. Mary wonders who will come to the party.
   b. Mary wonders whether Bill will come to the party.
   c. Mary wonders whether she should throw a party and who she would invite.

I end this section by discussing an issue about the nature of the TUD-stack. As I mentioned in §3.1.3, there are ways in which a question on the QUD-stack gets popped off. Ginzburg (1994) calls this process QUD-downdating, which takes place if the topmost question on the QUD-stack gets resolved, i.e., sufficiently answered (Ginzburg, 1995a), or if no information can be provided about the question. Similar ideas are proposed in Roberts’ (1996/2012) framework where a question is popped off the QUD-stack if it is answered or if it is determined to be unanswerable.

Note that the way that answers are currently modeled in the present theory, neither kind of answer has an effect on the TUD-stack since in their dynamic meanings the TUD component is empty. So, at this point, we can ask: when does a DR on the TUD-stack gets popped off? One answer is: when it is sufficiently identified, which is analogous to saying: when the question is sufficiently
answered or, equivalently, when it is resolved. To illustrate, consider the following scenario. Suppose speaker A is invited to a meeting in a village where she does not know many people and asks (193). In this case, it’s probably not going to be helpful if the addressee enumerates all the invitees by their names as in (193a). However, recognizing A’s goals and her limited knowledge about the village, speaker B may describe the invitees by certain properties they happen to have as in (193b). The latter answer intuitively seems like a more cooperative move and, therefore, not only felicitous but also desirable. Moreover, as Ginzburg points out, such answers can be *resolving* answers, i.e., sufficient answers to terminate an inquiry, provided that they take into account the goals and the knowledge of the asker.

(193) A: Who is invited to the meeting?

    B: Gabriel, Maria, Juan and Raul.

    B': The mayor and some teachers from the primary school.

As (193a,b) show, there are different ways of talking about the same plurality depending on context (broadly construed). How is this choice made? As Ginzburg shows, which of these possible ways the addressee chooses depends on (i) what kind of answer she thinks the asker is looking for and (ii) what the addressee can provide given what she knows. Thus, what counts as a resolving answer is contextually parameterized.\(^{37}\)

One can also imagine contexts as in (194) where, for all intents and purposes, the question gets resolved in the sense that the goal to answer it can be abandoned due to non-linguistic factors.

(194) Context: A and B are in the barn.

    A: Where’s Burrita?

    ...(Burrita walks into the barn.)

The current theory leaves the popping off a DR of the TUD-stack to an ancillary notion, call it *dismissal*, that operates on discourse contexts. Dismissal can apply (i) if, after an answer is

\(^{37}\)See van Rooy 1997 and van Rooy 2003 for more on this issue.
uttered and accepted, the question is sufficiently answered, or (ii) if the question has been deemed unanswerable, or (iii) if the goal to answer the question has been abandoned.
In this chapter, I discuss the distribution and interpretation of negation in K’iche’ in basic declarative sentences and in the two focus constructions discussed in Chapter 3. I first concentrate on the distribution of negation in basic declarative sentences and argue that the negation clitic $t(aj)$ ‘NEG’ attaches to the first prosodic word of the predicate of the sentence to be negated. I also show that the interpretation of negation in such sentences is clause-bound. Then, I discuss the distribution of negation in focus constructions and first show that in negated aree focus constructions, $t(aj)$ ‘NEG’ attaches to aree ‘FOC’. In negated answer focus constructions, on the other hand, $t(aj)$ ‘NEG’ has a variable distribution which has not been noted in the previous literature: it attaches to a prosodic word of the expression in the preverbal focus position but not necessarily to the first one (contra Henderson 2012). Interestingly, this variability in distribution has no effect on interpretation.

Based on how negative answers are formed and interpreted in K’iche’, I show that there are two different kinds of negative responses to positive constituent questions with different structures and interpretations. In the first kind of negative response, $t(aj)$ ‘NEG’ attaches to a prosodic word of the focused expression and I argue that this kind of response qualifies as a negative answer. For the second kind of negative response, where $t(aj)$ ‘NEG’ occurs in the verbal part of the sentence, I show that the preverbal expression is not focused but rather contrastively topicalized. I argue that this kind of response, although possible, does not qualify as an answer in the technical sense. Building on these observations, I take up the much-discussed issue of association with focus (e.g., Jackendoff, 1972; Rooth, 1996; Beaver & Clark, 2008; Herburger, 2016) in negative answers. I argue that the facts about K’iche’ motivate an alternative analysis which has implications for English. In particular, I propose an analysis of negative answers and negative responses in K’iche’ and in
English, without making recourse to association with focus or a mechanism to achieve that effect. The analysis also has the interesting implication that English does not have long negative answers.

Finally, I augment the K’iche’ fragment with an analysis of negative answers employing the mechanisms that DyCG provides to capture the distribution of negation across different sentences as well as the dynamic semantics needed to capture the interpretation of answer focus constructions and their interaction with negation in a compositional way.

4.1 Distribution and interpretation of negation in non-focus sentences

Negation in K’iche’ is indicated by the negative particle man\(^1\) ‘NEG’ before the predicate and the so-called irrealis particle\(^2\) =t(aj)\(^3\) ‘NEG’ after the predicate, with the form of =t(aj) ‘NEG’ conditioned by where it occurs (Mondloch, 1978; Larsen, 1988; López Ixcoy, 1997; Can Pixabaj, 2010; Henderson, 2012). Henderson (2012) argues that the phrase-final form =taj appears at the end of intonational phrases. Examples (195b) and (196b), which are the negated versions of (195a) and (196a), respectively, illustrate this pattern. In (195b), =t(aj) ‘NEG’ occurs at the end of an intonational phrase and is realized as =taj whereas in (196b), it assumes its non-phrase-final form and is realized as =.\(^4\) In both (195b) and (196b), the particles man and =t(aj) occur around the predicates

---

\(^1\)The negative particle man exhibits dialectal variation. In some dialects it is man, in some dialects it is ma and in yet others it is na (Larsen, 1988; Henderson, 2012). In the speech of all but one of my consultants man was never used and I indicate its optionality by parentheses.

\(^2\)The particle =t(aj) has been traditionally glossed as an irrealis particle as it is used in counterfactual constructions (Larsen, 1988; López Ixcoy, 1997). In negated sentences, however, it can be used without man as the latter has become optional in many dialects of modern K’iche’ (Larsen, 1988; Romero, 2012). Since =t(aj) can function as the sole negator, I follow Pye (2001) and analyze it as a negation particle and gloss it as ‘NEG’ in negated sentences.

\(^3\)Romero (2012) claims that the historical development of negation in K’iche’ is an instance of Jespersen’s Cycle. He notes that at an earlier stage of the language, =t(aj) occurred mainly in clauses with mana, the combination of the negative particle ma and the enclitic =na marking strong negative force. In Modern K’iche’, =t(aj) was reanalyzed as the negation marker and man became optional.

\(^4\)According to most of the previous literature, the non-phrase-final form of =t(aj) is =ta (Larsen, 1988; Can Pixabaj, 2010; Henderson, 2012). In the speech of my consultants, the non-phrase-final form is realized as [t]. See Romero 2012
as described in the literature. Based on examples like these, Pye (2001) argues that negation in K’iche’ is similar to negation in French in that the main negative particle, namely \( =t(aj) \) ‘NEG’, follows the finite verb.

\[ (195) \]

a. X-Ø-war-ik.

\[
\text{CMP-A3-sleep-SS} \\
\text{‘S/he slept.’}
\]

b. (Man) x-Ø-war \textbf{taj}.

\[
\text{NEG \ CMP-A3-sleep NEG} \\
\text{‘S/he didn’t sleep.’}
\]

\[ (196) \]

a. X-Ø-u-tij \text{ ri achi}.

\[
\text{CMP-A3-E3-eat DET man} \\
\text{‘The man ate it.’}
\]

b. (Man) x-Ø-u-tij=\textbf{t} \text{ ri achi}.

\[
\text{NEG \ CMP-A3-E3-eat=NEG DET man} \\
\text{‘The man didn’t eat it.’}
\]

With complement-taking verbs, \( =t(aj) \) ‘NEG’ can occur either with the main verb or with the verb of the complement. In (197) and (198), I exemplify this pattern with the complement-taking verb \textit{kuun} ‘be.able’. This verb occurs with a fully-inflected clause which isn’t cross-referenced on the verb by an absolutive marker. Larsen (1988) claims that sentences with \textit{kuun} ‘be.able’ involve two separate clauses. Negation can occur in either one of these clauses which results in a difference in meaning. For example, (197a) is acceptable in the context in (197) whereas (197b) isn’t. The same sentences behave differently in the context in (198).

\[ (197) \]

Context: You are sick so you can’t travel to the nearest town as you had planned. You say:

a. K-in-kuun=\textbf{t} \text{ k-in-b’ee-k}.

\[
\text{ICP-A1-be.able=NEG ICP-A1-go-SS} \\
\text{‘I can’t go.’}
\]

\footnote{for a similar observation about the phonological realization of this particle. I use this reduced form unless the data come from previous literature.}
b#K-in-kuun k-in-b’ee taj.
ICP-A1-be.able ICP-A1-go NEG
‘I can not go.’

(198) Context: You had planned to go to the nearest town but they tell you there isn’t any space in
the bus left for you. It is OK for you to stay that day. You say:

a#K-in-kuun=t k-in-b’ee-k.
ICP-A1-be.able=NEG ICP-A1-go-SS
‘I can’t go.’

ICP-A1-be.able ICP-A1-go NEG
‘I can not go.’

Verbs like k’am (u)b’i ‘take’ in (199a) call for a more fine-grained characterization of the dis-
tribution of negation. This verb carries the directional particle (u)b’i ‘DIR:thither’, derived from
the verb b’ee ‘go’, which indicates the direction of motion. Directionals form a morphosyntactic
category in many Mayan languages and constitute a closed set of verbal suffixes or particles derived
from intransitive motion verbs. They are used to express spatial notions like movement, path and
direction as in (199a). As Larsen (1988) points out, they may sometimes have idiomatic uses as in
(199b).

(199) a. X-∅-u-k’am (u)b’i pa k’ayb’al.
CMP-A3-E3-take DIR:thither PREP market
‘S/he took him/her/it to the market.’ (Larsen, 1988:304)

b. X-∅-u-b’ij kan chi k-∅-pe chi na.
ICP-A3-E3-say DIR:staying COMP ICP-A3-come again FUT
‘He left word that he would come again.’ (Larsen, 1988:308)

As the contrast between (200a) and (200b) shows, =t(aj) ‘NEG’ has to occur between the in-
flected verb and the directional particle (u)b’i ‘DIR:thither’ and cannot follow the latter. Note that
the status suffix -(i)k ‘SS’, which occurs at the end of intonational phrases (Henderson, 2012), can
attach to (u)b’i ‘DIR:thither’ as in (200a) while the phrase-final form =taj ‘NEG’ cannot. Therefore,
among the post-verbal particles =t(aj) ‘NEG’ occurs before directionals. Assuming that predicates
which bear directionals are listed as a unit in the lexicon together with the particular meaning that
they receive, this shows that $=t(aj)$ ‘NEG’ needs to be able to pick the inflected verb as its host in
predicates which bear directional suffixes.

(200)  Context: Carlos tells his daughter, Juana, to take her brother to the market for some shopping.
Later, he calls home and asks to see if she took her brother with her. His wife knows that
Juana left without her brother. She says:

a. $x\theta-u-k'am=t$  
$\text{CMP-A3-E3-take}=\text{NEG DIR:thither-SS}$  
‘She didn’t take him.’

b. $x\theta-u-k'am=tb'i$  
$\text{CMP-A3-E3-take DIR:thither NEG}$

Henderson (2012) proposes a characterization of the distribution of negation based on the ob-
servation that $=t(aj)$ ‘NEG’ is a clitic. In particular, he claims that $=t(aj)$ ‘NEG’ attaches to the
first prosodic word in the domain that negation operates over (p.746). Here, by domain Henderson
means a syntactic domain. He says that in basic declarative sentences the domain of negation is the
VP whereas in focus constructions, it is the pre-predicate expression (Robert Henderson, p.c.). In
his examples, he indicates the domain of negation by boldface (I will return to this point shortly).

According to Henderson, a prosodic word in K’iche’ is larger than a single light syllable, light
syllables are monomoraic and heavy syllables are bimoraic. He assumes that long vowels are bi-
moraic and that coda consonants bear a mora in K’iche’ (p.767). Consequently, a prosodic word has
to contain at least one heavy syllable which has either a long vowel in its nucleus, e.g., $\text{aree ‘FOC’}$,
or a coda consonant, e.g., $\text{in ‘I’ or r-uk ‘E3-COM’}$.

Given these assumptions, Henderson’s generalization captures the distribution of $=t(aj)$ ‘NEG’
in the data we have seen so far. In examples (195)-(198), the first prosodic word in the domain
of negation, namely the VP according to Henderson, is correctly predicted to be the host of $=t(aj)$

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5Prosodic words are the locus of stress in K’iche’, where stress falls on the final syllable of a prosodic word unless
that syllable is light non-root material, in which case it falls on the final root syllable (Henderson, 2012:767).
‘NEG’. In (200a), on the other hand, =t(aj) ‘NEG’ attaches to x-∅-u-k’am ‘s/he took it’, the first prosodic word of the VP but a subexpression of the predicate x-∅-u-k’am (u)b’i.

Henderson (2012:746) discusses an example similar to (201a) where he indicates that the domain of negation is the whole sentence.\(^6\) Since tajin ‘PROG’ is the first prosodic word in this domain, =t(aj) ‘NEG’ attaches to this word. The verb tajin ‘PROG’ takes as argument a fully inflected complement which functions as the subject and is thus cross-referenced on the verb by an absolutive marker. As Larsen (1988) points out, tajin ‘PROG’ is historically an intransitive verb which can carry an aspectual marker as in (201b) and its argument is cross-referenced on this verb by the absolutive marker -∅- ‘A3.’

(201) a. 0-tajin=\(t\) k-in-wa’-ik.
    A3-PROG=NEG ICP-A1-eat-SS
    ‘I am not eating.’

b. Ka-∅-tajin=\(t\) k-in-wa’-ik.
    ICP-A3-PROG=NEG ICP-A1-eat-SS
    ‘I am not eating.’

Henderson’s assumption about the domain of negation in (201a) predicts that negation cannot occur after the subject of tajin ‘PROG’, namely its fully inflected complement. This, however, is not the case as evidenced by (202a,b). Observe, in particular, that there are two negation morphemes in (202b): one in the clausal argument of tajin ‘PROG’ and one which is attached to tajin ‘PROG’, indicating that there is more than one domain that negation can apply. This piece of data shows again that the distribution of =t(aj) ‘NEG’ is sensitive to which clause negation is operating over.

(202) Context: Maria is telling her husband, Raul, about her recent trip to the capital. Suddenly, she realizes that he is not paying much attention to what she is saying. She accuses him by saying (202a), and Raul denies that by (202b).

\(^6\)In his example with tajin ‘PROG’, the whole sentence is boldfaced. This suggests that he does not consider the possibility that there may be more than one VP in such sentences.
Based on the data I discussed in this section, the generalization about the distribution of negation I propose is that =t(aj) ‘NEG’ attaches to the first prosodic word of the predicate of the sentence to be negated. Here, by a predicate I mean the main functor in the compositional analysis of the sentence, which may correspond to an intransitive verb, a transitive verb, or a complement taking verb, etc. This generalization is stated in (203).

(203) **Distribution of negation (first version)**

In a negated non-focus sentence, =t(aj) ‘NEG’ encliticizes to the first prosodic word of the predicate of the sentence to be negated.

In §4.2.2, I argue that the claim that negation targets the predicate of the sentence (in the sense of main functor) carries over to the analysis of negated focus sentences except for the fact the distribution of =t(aj) ‘NEG’ in answer focus constructions is variable when the expression in the focus position contains more than one prosodic word. In the next section, I turn to a discussion of the distribution and interpretation of negation in focus constructions.

### 4.2 Distribution and interpretation of negation in focus constructions

In the previous section, I discussed the distribution and interpretation of negation in non-focus sentences and argued that the clitic =t(aj) ‘NEG’ encliticizes to the first prosodic of the predicate of sentence to be negated and that its interpretation is clause-bound. In this section, I discuss the distribution and interpretation of negation in focus constructions.
4.2.1 Previous claims on the distribution of negation in focus constructions

The previous literature has claimed that when a focus construction like (204b), where the expression "Raul" occupies the focus position, is negated as in (204c), the negation particles occur around the focused expression (Larsen, 1988). This observation has led to the claim that in sentences like (204c), the focused expression is “negated” (Mondloch, 1978; Larsen, 1987, 1988; López Ixcoy, 1997; Can Pixabaj, 2010). Larsen (1987, 1988) further claimed, based on the distribution and realization of negation in focus sentences, that focused expressions are non-verbal predicates and that focus constructions have a biclausal structure (more on this below).7

(204) a. Chin x-∅-war-ik?
   who CMP-A3-sleep-SS
   Who slept?

   b. A Raul (x-∅-war-ik).
   CLF Raul CMP-A3-sleep-SS
   ‘RAUL (slept).’

   c. (Man) a Raul taj (x-∅-war-ik).
   NEG CLF Raul NEG CMP-A3-sleep-SS
   ‘Not RAUL.’

In the next section, I consider one possible interpretation of the claim that focused expressions are negated in sentences like (204c), deferring the discussion of a second possible interpretation until later. I also provide new data to show that the traditional claim about the distribution of negation in focus constructions is descriptively inadequate.

4.2.2 Distribution of negation in focus constructions

The first interpretation of the claim that focused expressions are “negated” is that it is a description of the distribution of negation in negated focus constructions. We can refer to focus-negation in this sense as morphosyntactically negating the expression in the focus position. As such, the claim is not about non-propositional expressions being negated semantically. In fact, taken in this sense, the

7I italicize the pre-predicate expressions in focus constructions.
claim is partially true since man...=t(aj) can occur around the whole pre-predicate expression as in (204c), or the particle =t(aj) ‘NEG’ can encliticize to this expression when it is used as the sole negator as in (205b) and (206b).

(205) Context: Raul used to be a fast runner. After he broke his leg and had to go through an operation, you thought that he wouldn’t be able to run that fast any more. After he recovered, you saw him running at a race and was surprised how fast he was. When your friend asks (205a), you say (205b):

a. Su mo’ x-Ø-u-tzaq aniim?
   how CMP-A3-E3-fall quickly ‘How did he run?’

b. Nojim taj (x-Ø-u-tzaq aniim).
   slowly NEG CMP-A3-E3-fall quickly ‘Not SLOWLY.’

(206) Context: María comes back from the kitchen and sees that the last tamale she had left on the table is gone. She asks (206a). You didn’t take it and don’t know who did. You say (206b):

a. Chin x-Ø-u-k’am b’i k’isb’al sub’?
   who CMP-A3-E3-take DIR:thither last tamale ‘Who took the last tamale?’

b. In taj (x-Ø-in-k’am b’i-k).
   I NEG CMP-A3-E1-take DIR:thither-SS ‘Not ME.’

Yet, the claim that negation particles occur around focused expressions fails to adequately describe the distribution of negation in focus constructions. As the examples (207) and (208) below from Henderson 2012 illustrate, =t(aj) ‘NEG’ can attach to expressions that are subexpressions of the pre-predicate expression. For example, in (207) and (208), =t(aj) ‘NEG’ attaches to aree ‘FOC’ and r-uk’ ‘E3-COM’, respectively. Henderson claims that in focus constructions, =t(aj) ‘NEG’ encliticizes to the first prosodic word in the domain of negation, which he takes to be the pre-predicate
expression (p.746). The hosts of $\text{=t(aj)}$ ‘NEG’ in (207) and (208) both constitute heavy syllables and, therefore, are prosodic words. Examples (205b) and (206b) are also accounted for since they have only one prosodic word in the pre-predicate expression. In addition, this generalization explains why $\text{=t(aj)}$ ‘NEG’ cannot attach to $\text{pa}$ ‘PREP’ in (209b) as the latter is a light syllable and therefore not an appropriate host.

(207) \textbf{Man} \textit{aree ta ri a Raul x-Ø-el-ik.}
\textit{NEG FOC NEG DET CLF Raul CMP-A3-leave-SS}
\textit{‘It wasn’t RAUL who left.’} \hfill \textit{(adapted from Henderson 2012:746)}

(208) \textit{Man r-uk’ ta ikaj x-Ø-u-ch’ay-b’e-j.}
\textit{NEG E3-COM NEG axe CMP-A3-E3-cut-INS-SS}
\textit{‘S/he didn’t cut it WITH THE AXE.’} \hfill \textit{(adapted from Henderson 2012:746)}

(209) a. \textbf{Man} \textit{pa k’ayib’al ta x-Ø-u-tij-o.}
\textit{NEG PREP market NEG CMP-A3-E3-eat-SS}
\textit{‘S/he didn’t eat it IN THE MARKET.’} \hfill \textit{(adapted from Henderson 2012:746)}

b. *\textbf{Man} \textit{pa ta k’ayib’al x-Ø-u-tij-o.}
\textit{NEG PREP NEG market CMP-A3-E3-eat-SS}

Henderson’s claim about the distribution of negation in focus constructions, namely that $\text{=t(aj)}$ ‘NEG’ attaches to the first prosodic word of the pre-predicate expression, is correct for \textit{aree} focus constructions but not for answer focus constructions that I discussed in chapter 3. First, observe that both (210b) and (210c) are ungrammatical as $\text{=t(aj)}$ ‘NEG’ does not attach to \textit{aree} ‘FOC’ as it does in (207). Note that we can describe the distribution of negation in \textit{aree} FCs by saying that it attaches to the first (and sole) prosodic word of the predicate, namely \textit{aree} ‘FOC’, thereby generalizing the distribution of negation in non-focus sentences to include the distribution of negation in \textit{aree} FCs.

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8Note that this is the same claim for the distribution of $\text{=t(aj)}$ ‘NEG’ in non-focus sentences modulo the domain that negation operates over.

9The examples in this section also show that $\text{=t(aj)}$ ‘NEG’ exhibits a low degree of selection with respect to its host. In other words, it can attach to hosts of different syntactic categories while always requiring the host to be a prosodic word, an observation which supports its status as a clitic (Zwicky & Pullum, 1983).
(210) a. Chin x-∅-u-k’am b’i k’isb’al sub’?
   who CMP-A3-E3-take DIR:thither last tamale
   ‘Who took the last tamale?’

   b.*Aree in taj.
   FOC I NEG

   c.*Aree a Raul taj.
   FOC CLF Raul NEG

However, as the examples in (211) and (212) illustrate, in the case of answer focus constructions, =t(aj) ‘NEG’ can either attach to a proper subexpression of the pre-predicate expression or can occur at the end of the pre-predicate expression, with no change in meaning, a pattern not predicted by any of the previous accounts. In particular, note that in (211c) and (212c), there are heavy enough words preceding the hosts of =t(aj) ‘NEG’ and yet it is possible for =t(aj) ‘NEG’ to not attach to those words. These examples, thus, show that when there is more than one appropriate host in the pre-predicate expression, the distribution of =t(aj) ‘NEG’ is variable. Furthermore, this variability does not affect the interpretation.

(211) Context: Juan is looking for his keys. He usually leaves them on the table in the living room.

   You are in the living room and the keys are not on the table. When he asks (211a), you say (211b,c):

   a. Ni k’o wi ri in-lawe?
      where exist PART DET E1-key
      ‘Where are my keys?’

   b. P-u-wi’=t ri mexa (k’o wi).
      PREP-E3-top=NEG DET table exist PART
      ‘Not ON THE TABLE.’

   c. P-u-wi’ ri mexa taj (k’o wi).
      PREP-E3-top DET table NEG exist PART
      ‘Not ON THE TABLE.’

(212) Context: Juan organized a party yesterday and invited all his friends and family. Normally a lot of people show up to his parties but there was a game at the same time. When you ask (212a), he says (212b,c):

121
a. Chin x-∅-pe pa nim q’ij iwir?
   who CMP-A3-come PREP party yesterday
   ‘Who came to the party yesterday?’

b. K’ii=t winaq (x-∅-pe pa nim q’ij).
   many=NEG person CMP-A3-come PREP party
   ‘Not MANY PEOPLE.’

c. K’ii winaq taj (x-∅-pe pa nim q’ij).
   many person NEG CMP-A3-come PREP party
   ‘Not MANY PEOPLE.’

The variability in the distribution of =t(aj) ‘NEG’ extends to cases where there are more than two possible hosts in the pre-predicate expression. In (213), for example, =t(aj) ‘NEG’ can attach to me’s ‘cat’ (213a), to saq ‘white’ (213b) or to laj ‘small’ (213c) with no change in meaning. Yet, similar to (209b) above, (213d) is ungrammatical as ri ‘DET’ is not an appropriate host.

(213) Context: It is Juan’s birthday and he got several gifts, one of which was a white kitten. Unfortunately, Juan doesn’t like cats at all. When his friend asks (213a), you say:

a. Ch-i-ke sipanik utz x-∅-r-il a Raul?
   PREP-E3P-GEN gift good CMP-A3-E3-see CLF Raul
   ‘Which gifts did Juan like?’

b. Ri laj saq me’s taj.
   DET small white cat NEG.
   ‘Not THE SMALL WHITE CAT.’

c. Ri laj saq=t me’s.
   DET small white=NEG cat
   ‘Not THE SMALL WHITE CAT.’

d. Ri laj=t saq me’s.
   DET small=NEG white cat
   ‘Not THE SMALL WHITE CAT.’

e.* Ri=t laj saq me’s.
   DET=NEG small white cat
The variability in the distribution of negation is also observed in sentences where the focused expression is a coordinate structure. As the data in (214) show, \( =t(aj) \) ‘NEG’ can encliticize to one of the three prosodic words of the expression in the focus position with no change in meaning.\(^{10}\)

(214)  Context: Juana asks who’s responsible for cleaning the classroom on Monday. Miguel says

*Raúl and María.* Juan corrects what Miguel says with (214a,b,c).

a. A Raúl \( =t \) r-ichb’il al María. A Raúl r-ichb’il a Roberto / A CLF Raúl=NEG E3-companion CLF María CLF Raúl E3-companion CLF Roberto / CLF Roberto r-ichb’il al María / A Roberto r-ichb’il a Carlos. Roberto E3-companion CLF María / CLF Roberto E3-companion CLF Carlos ‘Not Raúl and María. Raúl and Roberto / Roberto and María / Roberto and Carlos.’

b. A Raúl r-ichb’il=\( t \) al María. A Raúl r-ichb’il a Roberto / A CLF Raúl E3-companion=NEG CLF María CLF Raúl E3-companion CLF Roberto / CLF Roberto r-ichb’il al María / A Roberto r-ichb’il a Carlos. Roberto E3-companion CLF María / CLF Roberto E3-companion CLF Carlos ‘Not Raúl and María. Raúl and Roberto / Roberto and María / Roberto and Carlos.’

c. A Raúl r-ichb’il al María \( =taj \). A Raúl r-ichb’il a Roberto / A CLF Raúl E3-companion CLF María NEG CLF Raúl E3-companion CLF Roberto / CLF Roberto r-ichb’il al María / A Roberto r-ichb’il a Carlos. Roberto E3-companion CLF María / CLF Roberto E3-companion CLF Carlos ‘Not Raúl and María. Raúl and Roberto / Roberto and María / Roberto and Carlos.’

Based on the data discussed so far, I provide a revised generalization of the distribution of negation in K’iche’ in (215).

(215)  **Distribution of negation (final version)**

- In negated non-focus sentences and aree focus constructions, \( =t(aj) \) ‘NEG’ encliticizes to the first prosodic word of the predicate (main functor) of the sentence to be negated.

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\(^{10}\)As I discussed in chapter 3, the kind of data in (214) are arguably not answers. I include this example as evidence that the clitic \( =t(aj) \) ‘NEG’ can go inside a coordinate structure in a focus construction.
In negated answer focus constructions, \( t(aj) \) ‘NEG’ encliticizes to a prosodic word of the pre-predicate expression.

Having shown that the distribution of negation in answer focus constructions is variable, I turn to a discussion of the implications of this observation for the analysis of focus constructions.

### 4.2.3 Implications of the distribution of negation in focus constructions for the analysis of focus constructions

In this section, I consider certain implications of the distribution of negation in focus constructions for the analysis of focus constructions in K’iche’.

As I mentioned previously, Larsen (1987, 1988) claims that in K’iche’, focused expressions are non-verbal predicates and that focus constructions have a biclausal structure. Larsen’s claims are based on two analogies. First, he points out an analogy between (216) and (217) where he compares the distribution of negation in a declarative sentence with a non-verbal predicate, ajkuun ‘doctor’ in (216), to the distribution of negation in a focus construction where the negation particles enclose the focused expression are’ ‘s/he’ in (217). He takes the parallel between (216) and (217) as evidence that are’ ‘s/he’ in (217) is a non-verbal predicate. Presumably, this claim is based on the traditional assumption that negation particles in K’iche’ occur around the predicate of the sentence. Second, Larsen claims that in (217) \( t(aj) \) ‘NEG’ has to assume its phrase-final form\(^{11}\) and that, by analogy to (218), this shows that there is a clause boundary immediately before the post-focal expression. Larsen takes this as evidence that the focus construction in (217) is biclausal.

(216) Man ajkuun ta ri a Juan.
\[\text{NEG doctor NEG DET CLF Juan} \]
‘Juan is not a doctor.’ (adapted from Larsen 1987:51)

(217) Man are’ taj/*ta x-0-ch’ay-ow ri achi.
\[\text{NEG s/he NEG CMP-A3-hit-AG DET man} \]
‘S/HE didn’t hit the man.’ (adapted from Larsen 1987:51)

\(^{11}\)There is evidence against this claim as I exemplify in (220) below.
Larsen’s claims, based on the distribution and realization of negation in focus constructions in K’iche’, are important in the context of the two kinds of analysis of focus constructions in Mayan languages. The first kind of analysis argues for a monoclausal structure of focus constructions. In this analysis, the focused expression is analyzed as an argument of the predicate in the post-focal part of the sentence which occurs (in certain analysis as a result of movement) in a clause-initial position in the same clause that it originates (Craig, 1977; Norman, 1977; Mondloch, 1978; Hofling, 1984; Aissen, 1992; Trechsel, 1993; Zavala, 1997; Broadwell, 2000; Verhoeven & Skopeteas, 2015; Stiebels, 2006). The second kind of analysis argues that focus constructions have a biclausal structure either because the fronted expression is in a higher clause—as in Larsen’s analysis—or because the focused expression is a non-verbal predicate taking the post-focal expression as its argument (Bricker, 1979; Bohnemeyer, 2002; Tonhauser, 2003b,c).

For K’iche’, I showed above that the negation particles can occur around, or =t(aj) ‘NEG’ can attach to, subexpressions of the expressions in the focus position. However, this is not enough to claim that every such expression is a non-verbal predicate. For example, p-u-wi’ ‘PREP-E3-top’ in (211) cannot behave as a non-verbal predicate since it cannot bear absolutive marking. A sentence where p-u-wi’ ‘PREP-E3-top’ is used predicatively would require the existential k’o ‘exist’ which carries the absolutive marker as exemplified in (219b). Attaching the absolutive marker to p-u-wi’ ‘PREP-E3-top’ results in ungrammaticality as (219c) shows. Hence, contra Larsen, the distribution of negation in K’iche’ does not determine expressions that can be predicates in the sense used in the literature on Mayan.

(219) Context: Juana is looking for her youngest son, Raul. She asks (219a) and Raul says (219b).

a. A Raul, ni at-k’o wi?
   CLF Raul where A2-exist
   ‘Raul, where are you?’
b. In-k’o p-u-wi’ ri mexa.
   A1-exist PREP-E3 DET table
   ‘I’m on the table.’

c.*In-p-u-wi’ ri mexa.
   A1-PREP-E3 DET table
   (intended reading) ‘I’m on the table.’

The other claim Larsen made was that =t(aj) ‘NEG’ assumes its phrase-final form at the end of focused expressions. Recall that the form that =t(aj) ‘NEG’ takes is prosodically conditioned as I discussed above. Although it is possible for =t(aj) ‘NEG’ to assume its phrase-final form at the end of focused expressions, this is not a requirement as (220b) illustrates.

(220) a. Chin k’o jun u-ch’ich’?
   who exist one E3-machete
   ‘Who has a machete?’

   b. A Raul=t k’o-lik.
   CLF Raul=NEG exist-ss
   ‘Not RAUL.’

Larsen’s biclausal analysis for focus constructions, motivated by his arguments above, involves the movement of the focused expression to a higher clause. The second kind of biclausal analysis, on the other hand, is a non-movement analysis (see Bricker 1979; Bohnemeyer 2002 and Tonhauser 2003b,c for proposals in Yucatec Maya), where the pre-predicate expression is argued to be a non-verbal predicate which acts as the head of the clause. The post-focal expression, analyzed as a headless relative clause, is cross-referenced on the head, the focused expression, by the phonologically null third person absolutive marker. Yet, this analysis is problematic for K’iche’ (and for Tzeltal as Shklovsky (2012:130-131) shows). In K’iche’, relative clauses may be introduced by question words as in (221a), optionally by a determiner as in (221b), or by the complementizer chi ‘COMP’ as in (221c), but null-headed relative clauses with no marking are not well-formed as (221d) shows.

(221) a. K-in-b’e pa tinamit ni x-at-alax wi.
   ICP-A1-go PREP town where CMP-A2-be.born PART
   ‘I am going to the town you were born.’
   (adapted from Larsen 1988:501)
b. X-/ 0-inw-il  ri  aq (ri)  x-/ 0-u-kam-isa-j  ri  achi.
   CMP-A3-E1-see DET pig DET CMP-A3-E3-die-CAUS-SS DET man
   ‘I saw the pig that the man killed.’ (adapted from Larsen 1988:502)

c. X-/ 0-inw-il  ri  ixoq (chi)  x-/ 0-q’ab’ar-ik.
   CMP-A3-E1-see DET woman COMP CMP-A3-get.drunk-SS
   ‘I saw the woman who got drunk.’

d. X-/ 0-in-k’ij *(su)  x-/ 0-a-ya’  chi-we.
   CMP-A3-E1-sell what CMP-A3-E2-give PREP-E1-GEN
   ‘I sold what you gave me.’

In sum, based on the evidence from the distribution and realization of =tl(aj) ‘NEG’ in the examples I discussed above, and the fact that not every focused expression is a predicate, I argue against the claim that focused expressions are predicates in the sense that has been used in the literature on Mayan, i.e., a morphosyntactically determined unit, e.g., occurring sentence initially in basic declarative sentences, carrying inflection.\(^\text{12}\) I also provided evidence against a particular biclausal analysis of focus constructions based on the fact that null-headed relative clauses with no marking are ungrammatical in K’iche’.

Before concluding this section, I consider the analysis I proposed for answer FCs in chapter 3 in relation to the discussion so far. Recall that the analysis I proposed was motivated by the fact that answers are anaphoric to questions and that the foci in answers are type-raised over their continuations to capture this fact. As a result, the focused expression takes its continuation as argument, say, an S missing an NP, and yields an F. Broadly speaking, this particular analysis can be considered to assign a biclausal structure to answer FCs assuming S and F are thought of as different kinds of clause: the main clause is an F and the embedded clause (with a hole in it) is NP → S.\(^\text{13}\) Yet, the focused expression is not necessarily a predicate in the sense used in the Mayan literature.

Empirically, this analysis explains why there can be two negation morphemes in a focus construction in K’iche’ as in (225): one operating in the preverbal domain and one operating in the

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\(^{12}\)See Verhoeven & Skopeteas 2015 for similar arguments from Yucatec Maya.

\(^{13}\)I return to this point in §4.6 in the context of negative long answers in K’iche’ and the lack thereof in English.
post-focal domain where in each case negation targets a predicate in the generalized sense of main functor.¹⁴

(222) a. Chin k’o=t jun u-kematz’ib’?
   who exist=NEG one E3-computer
   ‘Who doesn’t have a computer?’

b. A Raul taj k’o=t jun u-kematz’ib’.
   CLF Raul NEG exist=NEG one E3-computer
   ‘Not RAUL.’

Having discussed the implications of the distribution of negation in focus constructions for the analysis of focus constructions, I now turn to a discussion about the interpretation of negation in focus constructions.

4.2.4 Previous claims on the interpretation of negation in focus constructions

In this section, I discuss the interpretation of negation in focus constructions by reviewing the previous literature where negation in focus constructions is described either as “constituent-negation” or as an operation used to “negate” constituents.

As I noted previously, the distribution of negation in focus constructions has led most descriptive work on K’iche’ to adopt the idea that focused constituents are “negated.” For example, Larsen (1988:436) claims that in (223) “it is an adverb that is being negated rather than the predicate q’ab’areel ‘drunk’.” Similarly, Can Pixabaj (2010) writes that in K’iche’ “[t]he constituents that are negated are those which are found between each pair of particles. Therefore, these constituents are focused.”

(223) Ri achi ma gas ta sib’alaj θ-q’ab’areel.
   DET man NEG really NEG very A3-drunk
   ‘The man isn’t really very drunk.’ (Larsen, 1988:436)

¹⁴See Bende-Farkas 2006b for a related proposal in Hungarian based on the possibility of having two negations in a focus construction. Shklovsky (2012:130) also points out the fact that focus constructions in Tzeltal can license two negations. He notes that this fact can be explained in a biclausal analysis despite the fact that he assumes a movement-based, monoclausal analysis of focus constructions.
Similar descriptions of negated focus sentences can be found for other Mayan languages. For Mam, England (1983b:244) writes “[n]egation is accomplished through the use of negative particles which are first in the sentence and followed immediately by the phrase or clause being negated. This automatically focuses negated nominals.” According to England, negation involves a change in the basic word order in Mam, just as focusing and question formation, in that “[t]he constituent that is negated, focused, or fronted is moved in front of the verb” (England, 1989). It seems as though the idea is that there is an operation of “constituent-negation” which involves fronting constituents. As such, what happens is not the negation of focus constructions. Instead, certain expressions are being fronted so that they can be targeted by negation.

Similarly, Broadwell (2000) distinguishes two different structural positions for Kaqchikel. In particular, there is a position for what he calls contrastive focus (ConFoc) which precedes the one for what he calls negated focus (NegFoc). He claims that focused NPs occupy the former position whereas “negated” NPs occupy the latter. As such, what I term negation in focus constructions above is captured by postulating additional structure in Broadwell’s analysis. Duncan (2003), in his analysis of Tz’utujil, adopts Broadwell’s proposal where negated NPs necessarily occupy the pre-predicate NegFoc position. By proposing two completely distinct structural positions, Broadwell and Duncan depart from the widely assumed analysis of Aissen’s (1992) where there is a single position for foci, [Spec, IP], and negation adjoins IP.

In general, although the term “constituent-negation” is used in the previous literature, there is no explicit discussion of the effect of this phenomenon on the interpretation of the sentence. Since it is not explicitly spelled out what the assumptions are, it is not clear whether “constituent-negation” as a construction with a particular structure is a viable analysis to capture negation in focus constructions.

Despite the lack of explicit assumptions and definitions, at a pre-theoretical level perhaps the claim is based on this idea: Because negation particles occur around the predicate in a basic declarative sentence where the predicate is negated, when they occur around some other constituent of a

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15Note the similarity to Can Pixabaj’s description for K’iche’ above.
sentence, it is that constituent that negation applies to. In the case of negating a predicate, what is intended is presumably the so-called VP-negation (or property negation), which semantically takes the denotation of a VP, a one-place predicate denoting a set of individuals, and returns its complement set (Dowty et al., 1981:95). After negation applies to the denotation of the VP, the derivation of the sentence would follow in the same way as the derivation of the corresponding sentence without negation.

The question is whether a similar idea can be applied to negation of focus constructions. The constituent negation analysis, in the way that Larsen puts it for instance, has to maintain that different syntactic categories, e.g., pronouns, noun phrases, prepositions, nouns, adverbs, adjectives and quantifiers can be targeted by a negation operator. However, it is not made clear what the interpretation of negation would be in such cases and how the sentence is compositionally put together after the focused expression is “constituent negated” by \( \neg(t(aj)) \).

As Toosarvandani (2013) points out in his discussion of constituent negation in sentences like Max eats not chard but spinach in English, sentence negation and constituent negation can be given a unified meaning, following Winter 2001, as in (224). Toosarvandani (2013:849) writes that when the complement operator ‘\(-\)’ takes a truth value as argument, it is interpreted as classical negation. When its argument is a function, on the other hand, it returns a function whose range is the complement of the original function’s range.\(^{16}\) As a result, regardless of whether not (or the corresponding negation morpheme in another language) combines with a full clause or some subclausal constituent, it can be given truth conditions which are equivalent to classical negation.

\[
\begin{align*}
X &= \begin{cases} 
    \neg X, & \text{if } X \text{ is a truth value} \\
    \lambda Y(\neg X(Y)), & \text{if } X \text{ is a function}
\end{cases} \\
\text{(Toosarvandani, 2013:849)}
\end{align*}
\]

\(^{16}\)This idea goes back to the treatment of negation in boolean semantics where negation, a cross-categorial phenomenon, is identified with the complementation operator (see, Keenan & Faltz 1985)
As far as the previous literature on Mayan is concerned, what is missing is an analysis of how negated focus constructions are put together compositionally such that negation would still act as a propositional operator. In particular, for an analysis along the lines of (224), what is needed is to clarify what \( Y \) would correspond to when the expression \( X \) is constituent negated. Note that if \( Y \) corresponded to the denotation of the post-focal expression, it would mean that \( Y \) must be an argument to \( X \) and one can use the second clause of (224) to get the desired interpretation. However, it is not clear whether this is the intended analysis of constituent negation in K’iche’ (or other Mayan languages for which a similar claim is made). Without an explicit assumption like this, it does not follow that every expression that is constituent negated can combine with the rest of the sentence since the post-focal expression would not necessarily be in the domain of the different kinds of expressions constituent negation can apply to. In the analysis of answer focus constructions I proposed in chapter 3, however, the focused expression is a function of its continuation, which corresponds to the post-focal expression. As a result, the compositional analysis involves the focused expression taking its continuation as argument regardless of the syntactic category of the focused expression. A negation operator can then be defined such that it takes wide scope over the expression obtained by applying the focused expression to its continuation, in a way analogous to (224). This, in fact, is the analysis of negation in answer focus constructions I develop in §4.5.2.

Before concluding this section, I consider another possible assumption related to the constituent-negation idea. This assumption involves treating the focused expression as a predicate along the lines of Larsen’s analysis discussed in the previous section. This analytical possibility involves a variant of the biclausal analysis which is motivated by the fact that, as noted in the previous section, focus constructions can license two negation morphemes, as exemplified in (225b).

(225) a. Chin \( x\Theta-k-esaj=t \) juntir utz?
   \( \text{who} \ CMP-A3\text{-E3P-get=NEG all} \ \text{good} \)
   ‘Who didn’t get 100%?’

b. A \( Raul=t \ x\Theta-r-esaj=t \) juntir utz.
   \( \text{CLF Raul=NEG CMP-A3\text{-E3-get=NEG all} \text{good} \ ‘Not RAUL.’} \)
One could argue that examples like (225b) show that focus constructions have a biclausal structure based on the assumption that negation is a clausal operator. As a result, one could say that focus constructions are similar to \textit{it}-clefts not only in terms of their interpretation (as is generally assumed in the literature, which I have argued to be false for answer FCs in K’iche’) but also in terms of their structure.\textsuperscript{17} For this analysis to work, one could argue that the higher clause, which contains the focused expression, either contains a (possibly covert) copula, so that the underlying structure would resemble that of an \textit{it}-cleft, or that the focused expression itself is the predicate of the higher clause. Thus, there would be one predicate per clause from which the fact that there can be two negations would follow. In the previous section, I showed that negation in K’iche’ does not necessarily identify a predicate in the traditional sense and thus the second claim would not be viable. The claim that the higher clause contains a copula would not be viable either since there is no evidence that answer FCs contain a covert copula.

However, note that at a theoretical level it is not necessarily the case that every clause consists of a traditional predicate and the expression that the predicate is predicated of. Sometimes a clause contains a focused or a topicalized expression which is type-raised over its own continuation to capture the desired interpretation of the sentence, as I mentioned in the previous section. In that case, we can call the type-raised expression a (generalized) predicate which is predicated of its continuation. In this sense, the traditional concept of a predicate is replaced by the notion of (categorial) functor in categorial grammar. Negation can then be modeled such that it can operate on predicates in general, as I show later in this chapter.

### 4.2.5 Interpretation of negation in focus constructions

Given that the distribution of negation in focus constructions is different than its distribution in non-focus sentences, and that not every focused expression is a predicate in the traditional sense, how can we explicate the interaction between focus and negation in focus constructions while still analyzing negation as a propositional operator? I propose to combine the observations about the

\textsuperscript{17}Shklovsky (2012) makes the same point for Tzeltal.
distribution =t(aj) ‘NEG’ with a long-standing claim about how negation and focus interact pragmatically (e.g., Jackendoff, 1972; Kadmon, 2001; Beaver & Clark, 2008) to argue that negation in focus constructions is propositional negation which takes wide scope over the whole sentence.

To begin with, recall that an answer FC is used to answer questions in discourse as illustrated in (226).\(^{18}\)

(226) a. Chin x-∅-k-esaj junjir utz?
   who CMP-A3-E3P-get all good
   ‘Who got 100%?’

   b. A Raul (x-∅-r-esaj junjir utz).
   CLF Raul CMP-A3-E3-get all good
   ‘RAUL (got 100%).’

As I argued in the previous chapter, the interpretation of an answer like (226b) gives rise to three main implications. First, there is the implication that the answer is anaphoric to the question in (226a) in the sense that it requires that the question be retrievable by the hearer(s), i.e., that the speaker commits herself that the hearer(s) can figure out which question is being answered. Second, there is the implication that Raul is in the domain restriction of the question. For example, if the conversation is about the students in a certain class, then Raul is one of them. The third implication of the answer is that it proffers that Raul is in the group of students who got 100%\(^{19}\).

That the answer in (226b) has the implications described above is crucial for the account that I propose because the idea that negation in focus constructions is propositional is based on the observation that when embedded under negation, the three implications associated with an answer FC behave differently. As has been noted repeatedly before, e.g., Jackendoff (1972); Kadmon (2001); Beaver & Clark (2008); Simons et al. (2011), when a sentence with a focused expression is negated, negation affects what is proffered, i.e., it targets the at-issue meaning. Consequently, negation in

\(^{18}\)I illustrate how the analysis works for answer FCs. The same idea carries over to aree FCs modulo the different implications the two constructions have.

\(^{19}\)Recall that in the discussion of answers in chapter 3, I made the simplifying assumption that the interpretation of answers in both English and K’iche’ give rise to these implications.
(27b) affects the proffered content and hence the negative answer proffers that Raul is not in the group of students who got 100%.

(27) a. Chin x-∅-k-esaj juntir utz?
   who CMP-A3-E3P-get all good
   ‘Who got 100%?’

   b. (Man) a  Raul taj (x-∅-u-tij lej).
      NEG  CLF Raul NEG CMP-A3-E3-eat tortillas
      ‘Not Raul.’

Note that the semantic scope of negation is propositional in this analysis but certain implications contributed by the meaning of (26b) project from under negation in (27b), e.g., the implication that the answer is anaphoric to a question. Put differently, the answer in (27b) is still anaphoric to the same question as (26b) but it is a negative answer to it. Thus, this analysis does not posit an operation that fronts constituents and “negates” them or an additional structure to capture negation in focus constructions. Rather, it analyzes negated focus constructions as negations of focus constructions where negation is still a propositional operator sensitive to the different implications of the focus construction.

4.3 Two kinds of negative responses in K’iche’

In this section, I discuss in more detail how negative responses to negative and positive questions are formed in K’iche’. First, I show that there are two distinct negative responses to a positive constituent question: (i) there are negative answers where, as I discussed in the previous sections, negation attaches to the pre-predicate focused expression, and (ii) there are negative responses where negation attaches to the predicate but the pre-predicate expression is not focused. I present evidence that in the latter kind of negative responses, the pre-predicate expression is contrastively topicalized. Thus, the generalization about the distribution of negation given in (215) in §4.2.1, namely that in a negated answer FC, =t(aj) ‘NEG’ attaches to the pre-predicate expression or a subconstituent thereof, can be maintained. Second, I show that a negative answer to a negative constituent question
can only be formed by attaching \( t(aj) \) ‘NEG’ to the pre-predicate focused expression. Finally, I show that with either positive or negative constituent questions, a negative short answer FC can only be interpreted as a negative answer.

To illustrate the two distinct negative responses to a positive constituent question, consider the data in (228). Note that in (228c) negation attaches to the verb rather than the preverbal expression as it does in (228b). I use the subscripts \( F \) and \( CT \) to indicate focus and contrastive topic, respectively.

(228) Context: Maria is going to bring lots of food to church and she needs help. Thinking about which neighbors could help, she asks (228a) and you know that Raul, one of the neighbors, is sick and is going to stay at home. You say (228b) or (228c):

a. Chin k-\( \emptyset \)-b’e pa tyox jaa?
   who ICP-A3-go PREP church
   ‘Who is going to church?’

b. A Raul \( taj \) (k-\( \emptyset \)-b’e-k).
   CLF Raul NEG ICP-A3-go-SS
   ‘Not Raul\(_F\).’

c. A Raul k-\( \emptyset \)-b’e \( taj \).
   CLF Raul ICP-A3-go NEG
   ‘RAUL\(_CT\) isn’t going.’

As discussed in the previous section, in negated answer FCs, \( t(aj) \) ‘NEG’ encliticizes to the pre-predicate expression or to a subexpression thereof. Hence, if a Raul ‘Raul’ in (228c) was focused, we would expect \( t(aj) \) ‘NEG’ to encliticize to it just as in (228b). However, there are two pieces of evidence which show that the response in (228c) is a different kind of negative response, as its translation suggests, than (228b) or its longer counterpart. In particular, I argue that the preverbal expression in (228c) is not focused, but rather contrastively topicalized. Observe that in English, the short answer ‘Not Raul’, with focal accent on Raul, and ‘RAUL is not going’, with contrastive topic accent on Raul, have different interpretations as evidenced by (229). In particular, (229d) is not acceptable as an answer to (229c) while (229e) is.

(229) a. Who’s going to church?
b. Juana is. Mario, too.

c. And Raul? / What about Raul?

d#Not RAUL_F.

e. RAUL_CT isn’t going.

As illustrated in (230), the corresponding responses in K’iche’, namely (228b) and (228c), repeated below in (230d) and (230e), respectively, behave in the same way. The response in (230d) was rejected by consultants in the context of (230c). Their comment was that (230d) can be an answer to (230a) but not to (230c). The response in (230e), however, was accepted without exception and it was also the answer that the consultants would volunteer. Consultants sometimes accepted and sometimes were doubtful about (230f). I suspect that this is because when this response is acceptable, it is interpreted as an answer to (230a), the initial question of the dialogue. This idea is supported by the fact that the continuation of the answer is not elided in (230f) as opposed to the answer in (230d) making the former easier to resolve to (230a) (cf. the discussion about long and short answers in §3.3.5). The contrast between (230d) and (230e) suggest that a Raul ‘Raul’ in the acceptable (230e) is not focused but rather contrastively topicalized as in the English example in (229e).

(230) Context: Same context as in (228) except that you know that the two neighbors Juana and Mario are going to the church, and that Raul isn’t.

a. Chin k-∅-b’e pa tyox jaa?
who ICP-A3-go PREP church
‘Who is going to church?’

b. Al Juana k-∅-b’e-k. A Mario, xuquje’.
CLF Juana ICP-A3-go-SS CLF Mario too
‘Juana is going. Mario, too.’

c. E a Raul?
and CLF Raul
‘And Raul?’
d. Raul *taj* (k-∅-b’e-k). Are’ ∅-yab’.  
CLF Raul NEG ICP-A3-go-SS he A3-sick  
‘Not RAUL$F$. He is sick.’

e. A Raul k-∅-b’e *taj*. Are’ ∅-yab’.  
CLF Raul ICP-A3-go NEG he A3-sick  
‘RAUL$CT$ isn’t going. He is sick.’

f.? A Raul *taj* k-∅-b’e-k. Are’ ∅-yab’.  
CLF Raul NEG ICP-A3-go-SS he A3-sick  
‘Not RAUL$F$. He is sick.’

The second piece of evidence for analyzing responses like (228c)/(230e) differently than answers like (228b)/(230d) comes from sentences where the preverbal focused expression is an oblique argument. In K’iche’, when oblique expressions, instrumental expressions and adjuncts are questioned or focused, the clitic wi ‘PART’ follows the verb (Larsen, 1988; López Ixcoy, 1997). In the negative answer in (231b), where =tl(aj) ‘NEG’ attaches to the focused expression, wi ‘PART’ is obligatory. When negation attaches to the verb, on the other hand, wi ‘PART’ cannot be used, cf. (231c) and (231d). This shows that in (231b), the preverbal expression is focused whereas in (231c) it isn’t.

(231) Context: Raul is the youngest child in the family and someone needs to take him to school everyday. He had a fight with his brother yesterday. So, when his mom asks (231a), he says:

a. Chin r-uk’ k-at-b’e wi pa tijob’al chuwe’q?  
who E3-COM ICP-A2-go PART PREP school tomorrow  
‘Who are you going to school with tomorrow?’

b. R-uk’=t w-atz k-in-b’e *(wi). R-uk’ in-xb’al.  
E3-COM=NEG E1-brother ICP-A1-go PART E3-COM E1-sister  
‘Not with MY BROTHER$F$. With MY SISTER$F$.’

c. R-uk’ w-atz k-in-b’e *taj*. R-uk’ in-xb’al.  
E3-COM E1-brother ICP-A1-go NEG E3-COM E1-sister  
‘I am not going with MY BROTHER$CT$. With MY SISTER$F$.’

d#R-uk’ w-atz k-in-b’e=t wi. R-uk’ in-xb’al.  
E3-COM E1-brother ICP-A1-go=NEG PART E3-COM E1-sister  
(intended reading) ‘Not with MY BROTHER$F$. With MY SISTER$F$.’
The examples in (228), (230) and (231) where t(aj) ‘NEG’ attaches to the preverbal focused expression count as long/short negative answers in our terminology because the continuations of the preverbal expressions are congruent with those of the question words. The parenthesization in the answers indicates that the continuation can be anaphorically elided, yielding a short negative answer. The other kind of response is not technically an answer because the continuation of the preverbal expression is not congruent with that of the question word since the former contains t(aj) ‘NEG’.

Of course, the continuation of the preverbal expression does not have to contain negation in order for it to be incongruent with the continuation of the question word. The response in (232b) patterns like the negative response in (232c) in that both responses do not allow wi ‘PART’ in the post-verbal part of the sentence indicating that the pre-verbal expression is not focused. As above, the negative answers in (232e,f) require wi ‘PART’ in the post-verbal part of the sentence.

(232) Context: Juana wants to find out who Roberto is working with in the afternoon. She asks him

(232a). Roberto can’t remember who he is working with in the afternoon but if he knows he is working with Maria in the morning, he can say (232b) or (232c). (232d) is not acceptable in this context. If Roberto knows that he is not working with Maria in the afternoon, he can say (232e,d) as a negative answer.

a. Chin r-uk’ k-at-chakun wi qajq’i? who E3-COM ICP-A2-work PART later ‘Who are you working with in the afternoon?’

b. R-uk’ al Maria k-in-chakun (*wi) b’ajchi’. E3-COM CLF Maria ICP-A1-work PART early ‘I am working with MARIA\textsubscript{CT} in the morning.’

c. R-uk’ al Maria k-in-chakun taj. E3-COM CLF Maria ICP-A1-work NEG ‘I am not working with MARIA\textsubscript{CT} (as I am working with her in the morning).’

d#R-uk’ al Maria k-in-chakun=\texttt{t} wi. E3-COM CLF Maria ICP-A1-work=NEG PART ‘(intended reading) Not with MARIA\textsubscript{F}.’
Having shown that there are two distinct negative responses to positive constituent questions in K’iche’, I turn to a discussion of negative answers to negative constituent questions. The data in (233) show that with a negative constituent question, a negative answer can only be formed by enclitizing $=t(a)b’$ ‘NEG’ to the preverbal focused expression (or a subexpression thereof). The response in (233c) is not acceptable in the context of (233) since Raul is going to church. If the preverbal expression is focused, then (233c) becomes a positive answer in the context of (234) as (234b) shows.

(233) Context: It is Sunday and Maria wants to go to church. She needs someone who can take care of her daughter. Not everybody goes to church on Sundays. She asks (233a) and you know that Raul is going to church and so he can’t help. You say (233b).

a. Chin k-$\emptyset$-b’e=$t$ pa tyox jaa?
   ‘Who isn’t going to church?’

b. A Raul $taj$ (k-$\emptyset$-b’e $taj$).
   ‘Not RAUL.’

c#A Raul k-$\emptyset$-b’e $taj$.
   ‘RAUL isn’t going.’

(234) Context: Same as (233) except that you know that Raul is going to stay at home so he might be able to help. You say (234b).

a#A Raul $taj$ (k-$\emptyset$-b’e $taj$).
   ‘Not RAUL.’
Based on the data discussed in this section, the generalization about negative responses to positive/negative constituent questions in K’iche’ is given below in (235).

**Generalization about negative responses to negative and positive constituent questions**

(235) 1. With a positive constituent question, there are two kinds of negative responses: one where negation attaches to the preverbal focused expression, and one where negation attaches to the verb but the preverbal expression is not focused but rather contrastively topicalized. Only the first kind of response counts as an answer in our terminology.

2. With a negative constituent question, a negative answer can only be formed by attaching negation to the focused expression.

3. With either kind of question, a short answer with the focused expression and negation can only be interpreted as a negative answer.

In the next section, I turn to a discussion of positive and negative answers in K’iche’ in the context of association with focus.

### 4.4 Positive and negative answers in K’iche’ and association with focus

The issue of how negation affects the interpretation of focus has received considerable attention in the literature (Jackendoff, 1972; Karttunen & Peters, 1979; Jacobs, 1991; Rooth, 1996; Beaver & Clark, 2008; Herburger, 2016). In particular, the effect of negation in answers has often been described under the rubric of association with focus (Jackendoff, 1972). The term association with focus refers to the claim that the interpretation of negation, among other focus-sensitive operators like *only*, *even*, *also*, modals, etc., is sensitive to the focal structure of the sentence it occurs in.
In this section, I first discuss the effect of negation in answers and, in particular, consider sentences like *JOHN didn’t get 100%*, which are claimed to be ambiguous in English. Next, I discuss a particular analysis of such sentences due to Beaver & Clark (2008) which makes use of focus alternatives and a principle which they call the Focus Principle that operates on logical forms. Then, I discuss the corresponding K’iche’ data and show that they do not exhibit the ambiguity that is claimed to exist in English. Based on the interaction between negation and answers in K’iche’, I motivate an alternative, compositional analysis of negative answers which makes no recourse to association with focus or a mechanism to achieve that effect. This analysis also has implications for English, in particular, that English does not have long negative answers. But before discussing the K’iche’ data in detail and the alternative analysis they motivate, I consider the claims about how negation and focus interact in English.

### 4.4.1 Association with focus in negative answers

It has been noted that variation in prosodic prominence in negated sentences in English can yield different interpretations (among others, Jackendoff 1972; Jacobs 1991; Kadmon 2001; Beaver & Clark 2008; Herburger 2016). To illustrate, consider the two sentences in (236). According to Beaver & Clark (2008), in (236a), with focus on *linguistics*, the speaker denies that Kim studies linguistics whereas in (236b), with focus on *Northwestern*, the speaker denies that Kim studies at Northwestern. Jackendoff (1972:257) describes this phenomenon by saying that negation optionally associates with focus (or dissociates from presupposition).

(236)  
\[ \begin{align*} 
&\text{a. Kim doesn’t study LINGUISTICS at Northwestern.} \\
&\text{b. Kim doesn’t study linguistics at NORTHWESTERN.} \quad (\text{Beaver & Clark, 2008:45}) 
\end{align*} \]

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20Here, I use the term ‘variation’ to cover both the variation in the location of prosodic prominence, i.e., which expression is made prominent, and the variation in the type of prosodic prominence, i.e., use of different pitch accents.

21Below, I discuss when association with focus is supposed to take place.
Beaver & Clark say that in (236a) and (236b), negation applies to only the focused part of the entire sentence and, in an intuitive sense, the remainder of the sentence is not negated. Put differently, the claim is that in (236a), the speaker does not deny that Kim studies at Northwestern, and in (236b), the speaker does not deny that Kim studies linguistics. Jackendoff (1972:254) describes this intuition by saying that “often negation does not seem to apply to an entire sentence, but only to part of it” and suggests that negation associates with focus or, in other words, negation is focus sensitive.

In relation to the claim that negation is focus sensitive in sentences like (236a) and (236b), it is usually suggested that the interpretations of such sentences give rise to inferences which differ based on the variation in prosodic prominence that these sentences exhibit. For example, according to Beaver & Clark (2008:45), (236a) suggests that Kim does study something other than linguistics, whereas (236b) suggests that Kim studies linguistics somewhere other than Northwestern. However, Beaver & Clark (2008:49) also add that such inferences can be canceled, for example, by saying In fact, she doesn’t study anything at Northwestern!, following (236a). Based on this observation, they claim that such inferences have the status of implicatures, contra Herburger (2016:29), who claims that the existential implication is an entailment.

Rooth (1996) also argues that it is misconceived to posit an existential implication (as an assertion or a presupposition) in the analysis of negation based on examples like (236) where focus and negation co-occur. The reason, as Rooth points out, is that the effect observed in the so-called association with focus cases disappears in certain contexts. For example, in (237B), Rooth says that the speaker isn’t conveying that someone is going to dinner with the colloquium speaker as it would contradict the first thing she says.

(237) A: Is anyone going to dinner with the colloquium speaker?

B: I don’t know. I’m not going. (Rooth, 1996:294)

Rooth proposes two possible analysis for the second sentence in (237B). In the first analysis, negation takes scope over the focus interpretation operator where the evoked alternatives are of the
form “$x$ is going” which are somehow licensed by the context. The other possible analysis is where the context licenses negative alternatives of the form “$x$ is not going” in which case negation has narrow scope. Although Rooth does not discuss the details of these analyses, he considers both of them to be plausible. Crucially, what he points out is that in either case we are not dealing with negation associating with focus, but rather with boolean negation together with focus alternatives with a discourse motivation (Rooth, 1996:294-295).

The two analyses that Rooth entertains for the second sentence in (237B) above, in fact, correspond to the two readings of the sentences where focus and negation co-occur in English (Jackendoff, 1972; Jacobs, 1991; Beaver & Clark, 2008; Herburger, 2016). In particular, the two readings are appropriate in different discourse contexts, e.g., different questions, and are disambiguated by intonation (Jackendoff, 1972:259). To illustrate, consider the sentence in (238) with prosodic prominence on John.

(238) John didn’t get 100%.

(239) Which students got 100%?

(240) Which students didn’t get 100%?

In the sentence in (238), if the expression John bears an A accent, then the sentence is taken as a positive answer to the negative question in (240). Jackendoff (1972:256) describes this reading as the one where negation is part of the presupposition and writes “[T]he A accent coupled with negation means that the focus is a correct value for a negative presupposition” (p.354). If John bears a B accent, on the other hand, then the sentence is taken as a negative answer to the positive question in (239). Jackendoff (1972:256) describes this reading as the one where negation is not part of the presupposition and writes “...the B accent coupled with negation means that the focus is an incorrect value to satisfy the positive presupposition” (p.354).

22 Rooth notes that Jackendoff (1972) realized that positing an existential presupposition in the semantics of negation was too strong and that he suggested instead that the alternatives Rooth discusses for the two readings were relevant in discourse.
Jackendoff’s analysis of the two readings of (238) can be summarized as follows. First, the sentence is split into two parts: focus and non-focus. To get the asserted content, the non-focus part is applied to the focus part. However, if the focus is marked with a B accent, then the negation is removed from the non-focus part, it “undergoes association with focus”, and takes wide scope. As Jackendoff (1972:257) writes “if an expression undergoes association with focus, it makes no contribution to the presupposition, but instead alters the form of the assertion.” Consequently, the two readings arise as a scopal difference of negation that somehow is sensitive to which accent is used. Crucially, it is the second reading of (238) with a B accent on the prominent expression that occasions association with focus, and it is interesting to note, in this connection, that the B accent is typically described to mark contrastive topics (Büring, 2003). In addition, Beaver & Clark (2008:49) claim that only for this reading does the (cancelable) implicature discussed above arise.

In the next section, I consider their account of negative answers, couched in an alternative semantics framework, in more detail.

4.4.2 Beaver & Clark’s (2008) analysis of negative answers

Beaver & Clark (2008:5) claim that focus can and should be interpreted uniformly using Rooth’s alternative semantics. In their account, focus is taken to introduce a set of alternatives and the focal structure of a clause is tied to the context of utterance in which it can be felicitously uttered. In particular, they say that focus determines information structure, which, for them, means that it determines the QUD (Beaver & Clark, 2008:45), following Roberts 1996/2012. The way Beaver & Clark interpret focus and, consequently, the question-answer relation involves calculating the so-called focus alternatives in the compositional buildup of a declarative sentence.

In Beaver & Clark’s account, the calculation of the focal alternatives of a sentence is subject to what is called the Focus Principle. This principle states that some part of a declarative sentence should evoke a set of alternatives containing those of the question that the sentence is taken as an answer to (Beaver & Clark, 2008:37). The denotation of the question is required to be a subset of
the evoked alternatives. The Focus Principle is formulated to capture congruency, a defining characteristic of answers in Beaver & Clark’s and related theories based on Alternative Semantics (e.g., Rooth, 1992; Roberts, 1996/2012) or Structured Meanings (e.g., von Stechow, 1991; Krifka, 2001), as I discussed in chapter 3. A property of the Focus Principle, which is crucial for the analysis of sentences like (238), is that it is weaker than, say, the corresponding principle in Roberts 1996/2012. As I mentioned in chapter 3, Roberts requires that when a declarative sentence is asserted, the complete sentence must be congruent to the current QUD, whereas Beaver & Clark require that only a part of it is congruent. According to Beaver & Clark, this relaxation simplifies the analyses of sentences in which a sentential clause is embedded under a propositional operator.

To illustrate the effect of the Focus Principle, consider the sentence in (241a). In Roberts’ account, this sentence would be congruent only to the question in (241b) since she requires the full sentence to be congruent to the question it is taken to answer. Beaver & Clark point out that interpreting (241a) as an answer to (241c) would require additional accommodation in Roberts’ account. In Beaver & Clark’s account, on the other hand, (241a) can be interpreted as an answer to both (241b) and (241c), given the Focus Principle. In particular, if the alternatives are evoked in the embedded clause, the sentence can be taken as an answer to (241b). Note that in this case, it is the argument of the propositional operator, rather than the entire sentence together with the operator, that is congruent to the question. If the alternatives are evoked at the level of the full sentence, then the sentence can be taken as answer to (241c). Thus, the choice of where to evoke alternatives yields an ambiguity.

(241)  a. I think MARY laughed.

    b. Who laughed?

    c. Who do you think laughed?

With the analysis of (241a) in mind, I now turn to the analysis of sentences like (238) in Beaver & Clark’s account. Beaver & Clark (2008:45-50) assume that “at the level of representation at which alternatives are calculated, negation is a propositional operator taking wide scope over the subject.”
Then, similar to the analysis of (241a), the ambiguity in (238) depends on at which level “sets of alternatives” are “evoked in the compositional buildup of the sentence meaning.” If it is at the level of the full sentence, the alternatives are of the form *X didn’t get 100%* and the interpretation corresponds to the positive answer to the negative question. If the alternatives are “evoked” at the level immediately under negation, the alternatives are of the form *X did get 100%* and the interpretation corresponds to the negative answer to the positive question. Note that, similar to the analysis of (241a) as an answer to (241b), it is the argument of the propositional operator (here, negation), rather than the full sentence, that is taken to be congruent to the question (Beaver & Clark, 2008:51). Since the alternatives congruent to both of the questions in (239) and (240) are evoked, it is predicted that (238) can answer both of the questions.

Based on what Beaver & Clark say about the analysis of sentences like (241a), where a sentential clause is embedded under a propositional operator, the representation in (242) seems to be what is assumed as the structure of (238).

(242) \(\text{Neg (JOHN did get 100%)}\)

To get the reading where (238) is a positive answer to the negative question in (240), Beaver & Clark presumably let negation apply to its clausal argument and then calculate alternatives at the level of the full sentence. Note that in this case focus takes scope over negation. This calculation would yield a set of alternatives congruent to the negative question.

To get the other reading, Beaver & Clark need the alternatives to be evoked in the embedded clause so that the alternatives would be congruent to the positive question in (239). Note that in this case negation takes scope over focus. However, it is not entirely clear what the options are for compositionally building up the relevant reading in this case. In particular, it is not clear how negation applies to its argument, which is a set of propositions, to yield the focus semantic.

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23 This is the reading which Jackendoff (1972) described as negation associating with focus where the prominent expression receives a B accent.

24 This is analogous to the second analysis that Rooth (1996:295) considers for the sentence in (237b).

25 This is analogous to the first analysis that Rooth (1996:294) considers for the sentence in (237b).
value of the full sentence. Does this procedure require point-wise function application? Perhaps not. Because otherwise the resulting set of propositions would not be different from the set of propositions obtained for the other reading. Therefore, it seems as though once the alternatives are calculated at the level of the embedded sentence, they don’t have an effect at the level of the full sentence any more. In other words, their effect is neutralized and negation only applies to the ordinary semantic value of JOHN *did get 100%*. As far as I can tell, Beaver & Clark don’t say in the analysis that they sketch how this is achieved.

To summarize, it seems that what is intended in Beaver & Clark’s analysis is there to be only one logical form for the sentence in (238). Then, by appealing to the Focus Principle, one gets to choose which node one can evoke alternatives and find a question that the sentence can be congruent to. One then calculates two possible focus semantic values corresponding to the two readings that the sentence in (238) is claimed to have. But, how are the two meanings distinguished once the sentences are put together compositionally, i.e., once we carry out full derivations for the two readings? Their focus semantic values are different because the choice of where to evoke alternatives is different. In the compositional build-up of the reading where (238) is analyzed as a negative answer, something special needs to be done so as to prevent the focus alternatives to propagate up to the level of the full sentence. Note that if this is the way that the intended interpretations are

---

26 In this analysis, what Beaver & Clark aim to capture seems analogous to the scopal ambiguity in Jackendoff’s analysis. But by appealing to the Focus Principle, they seem to be doing something different than scoping, e.g., Quantifier Raising. The reason for this might be because they want scopal phenomena to be subject to island constraints, whereas focus is not.

27 Another possibility that would have the same effect would be to employ a special rule like $[\text{Neg } S]^f = [S]^f$, which effectively says that the negated sentence and the sentence itself has the same focus semantic value. Beaver & Clark (2008:83) use an analogous rule in the analysis of *only*-VP sentences. Such an analysis would be in-line with Beaver & Clark’s assumption that it is not the full sentence but rather the argument of the negation operator that is congruent to the question in the case where (238) is interpreted as a negative answer to the positive question in (239). It would also be in-line with the idea that negative statements can be congruent to both positive and negative questions (Beaver & Clark, 2008:45, fn.2). However, positing a special rule would contradict Beaver & Clark (2008:49)’s point that nothing special needs to be said about negation and their claim that negation does not have any conventionalized sensitivity to focus.
computed, then it means that the Focus Principle acts as a constraint on the semantic representation, i.e., logical form. Not only are such constraints eschewed in frameworks with a directly compositional architecture (cf. Barker & Jacobson 2007) like DyCG, it is also desirable to provide analyses which are simpler, and which do at least as well and even better than the analyses which appeal to constraints on semantic representations (see Jacobson 2016 for a discussion on this issue).

In the next section, I motivate such an analysis of sentences like (238). First, I consider the similarities and differences between positive and negative answers in K‘iche’ and English. In particular, I show that the sentences corresponding to the two readings of (238) are not string-identical in K‘iche’. Crucially, the sentence corresponding to the alleged negative answer to the positive question involves topicalization. Based on how negation and focus interact in K‘iche’, I motivate an alternative analysis of negative answers which does not make recourse to association with focus, calculation of focus alternatives, or constraints on semantic representations in the analysis of sentences like (238).

4.4.3 Positive and negative answers in K‘iche’

Recall that sentences like (238), repeated below in (243), are often claimed to be ambiguous in English. In particular, (243) can be a negative answer to (244) or a positive answer to (245).

(243) JOHN didn’t get 100%.

(244) Which students got 100%?

(245) Which students didn’t get 100%?

In §4.2 and §4.3, I showed that in K‘iche’ a negative answer to a positive question is formed by encliticizing =t(aj) ‘NEG’ to the preverbal focused expression or a subexpression thereof. I also argued that in a negative response to a positive constituent question, if =t(aj) ‘NEG’ encliticizes to the verb, then the preverbal expression is not interpreted as focused but rather contrastively topicalized. The fact that negation always occurs in the preverbal domain in negative answers in K‘iche’ means
that such answers do not exhibit the ambiguity that their English counterparts do, as I illustrate below.

In K’iche’, the sentences corresponding to the two readings of (243) are different in two respects. First, observe that (246b), the counterpart of the (alleged) negative answer to the positive question, and (247b), the counterpart of the positive answer to the negative question, are not string-identical since \t(aj) ‘NEG’ attaches to the pre-predicate expression A Raul ‘Raul’ in (246b) while it attaches to the predicate x-∅-k-esaj ‘CMP-A3-E3p-get’ in (247b).

(246) a. Chin tijoxel-ab’ x-∅-k-esaj juntir utz?
   who student-PL CMP-A3-E3p-get all good
   ‘Which students got 100%?’

   b. A Raul \textbf{taj} x-∅-r-esaj juntir utz.
   CLF Raul NEG CMP-A3-E3-get all good
   ‘Not Raul.’

   c#A Raul x-∅-r-esaj=t juntir utz.
   CLF Raul CMP-A3-E3-get=NEG all good
   ‘(intended reading) Not Raul.’

(247) a. Chin tijoxel-ab’ x-∅-k-esaj=t juntir utz?
   who student-PL CMP-A3-E3p-get=NEG all good
   ‘Which students didn’t get 100%?’

   b. A Raul x-∅-r-esaj=t juntir utz.
   CLF Raul CMP-A3-E3-get=NEG all good
   ‘RAUL didn’t get 100%.’

   c. A Raul \textbf{taj} x-∅-r-esaj=t juntir utz.
   CLF Raul NEG CMP-A3-E3-get=NEG all good
   ‘RAUL didn’t not get 100%.’

   d#A Raul \textbf{taj} x-∅-r-esaj juntir utz.
   CLF Raul NEG CMP-A3-E3-get all good

   More importantly, negation cannot take wide scope in (247b), which means that it cannot be a negative answer to (246a), hence the unacceptability of (246c) with the intended negative answer reading. Rather, (246c) is a sentence where a Raul ‘Raul’ is topicalized out of a negative sentence, as I discussed in §4.3. Similarly, (246b) cannot be used as a negative answer to (247a), hence the
unacceptability of (247d). To provide a long negative answer to (247a), one would use (247c) where, notably, there are two negators: one attaches to the preverbal expression and the other to the verb. These data show that the placement of \(=t(aj)\) ‘NEG’ is sensitive to which question is being answered and whether the answer is positive or negative. Observe that the scopal difference that figured into the analysis of their counterparts in English can actually be seen in the surface form of the negative and positive answers in K’iche’ in that one can tell by looking at the word order what the intended interpretation is.\(^{28}\) However, in the reading that licenses the effect of “association with focus”, it is the contrastive topic that takes wide scope, not negation.

Note that, similar to its K’iche’ counterpart, the case where (243) is analyzed as a negative answer to (244) can, in fact, be analyzed as a sentence where the prosodically prominent expression *John* is topicalized out of a negative sentence. In fact, such an analysis would be in line with the way that accents are interpreted in English since the so-called “association with focus” is occasioned when the prosodically prominent expression bears a B accent which is typically considered to mark contrastive topics (Büring, 2003). Such an analysis also suggests that, unlike K’iche’, English does not have long negative answers. This follows from two observations: (i) the alleged long negative answer to a positive question is not an answer but rather a negative response where the prosodically prominent expression is contrastively topicalized, and (ii) in English, unlike K’iche’, it is impossible for the short negative answer to have an (audible) continuation, compare (248b) and (249b). If the observation that English does not have long negative answers is correct, then it would be an unwelcome result for accounts like Beaver & Clark’s (2008) because although congruency is a defining characteristic of answers in their theory, what is treated as a long negative answer actually is not congruent to the positive question and therefore is not an answer.

(248)  

a. Which students got 100%?  
b. Not JOHN (*got 100%.)

\(^{28}\)According to Herburger (2016:32), this is also true for Hungarian and Basque.
In English, if the question is negative as in (250a), there are two options that can be used to provide a short answer. The answer in (250b), where the VP complement of the contracted negative auxiliary is elided, is interpreted as a positive answer. Note that (250b) does not count as a short negative answer to (248a) for the same reason that its longer counterpart does not count as a negative answer to the same question. The answer in (250c) is interpreted as a short negative answer which, like (248b) and unlike its counterpart in K’iche’ in (251b), cannot be followed by an overt continuation in English.

(250) a. Which students didn’t get 100%?
   b. JOHN didn’t (get 100%).
   c. Not JOHN (*got 100%).

The interpretation of negative answers in K’iche’ suggests that we need a way to retrieve the questions they are answers to so as to distinguish between negative answers to a positive question as in (246b), positive answers to a negative question as in (247b), or negative answers to a negative question as in (247c). To capture the behavior of the K’iche’ data, I proposed an analysis where instead of calculating alternatives at different levels in the compositional build-up of a sentence and finding questions that the sentence can answer, as in Beaver & Clark’s (2008) account, we rather
interpret an answer with respect to the question it answers in discourse. This way, the desired interpretations for the K'iche' data discussed above can be captured by modeling the question-answer relation dynamically, thereby distinguishing among positive/negative answers to positive/negative questions. In addition, based on the observations made above, we can analyze negative responses where negation does not attach to the preverbal expression as cases of topicalization, without making recourse to association with focus, since such responses are non-answers where the continuation of the topicalized expression just happens to contain negation.

4.5 K’iche’ fragment: negation

In this section, I augment the K’iche’ fragment I developed in chapter 3 with a formal analysis of negation that captures the generalizations reached in this chapter. In the next section, I start with the analysis of negation in basic declarative sentences.

4.5.1 Negation in basic declarative sentences in K’iche’

Recall that in a negated basic declarative sentence, \( \text{=t(aj)} \) ‘NEG’ attaches to the first prosodic word of the predicate of the sentence. To capture this generalization, I analyze \( \text{=t(aj)} \) ‘NEG’ as a function which takes as argument an expression of type S, i.e., a sentence, encliticizes \( \text{=t(aj)} \) ‘NEG’ to the first prosodic word of the sentence, which corresponds to the predicate, and returns an expression of type S. In the phenogrammar, encliticization calls for being able to pick up the first prosodic word of a string of words (possibly of length one) and attaching \( \text{=t(aj)} \) ‘NEG’ to it. This operation, as I describe below, requires certain refinements to the phenogrammatical setup introduced in chapter 2. Finally, in the semantic component, we want the propositional negation operator \( \text{NOT} \) to outscope the meaning of the whole sentence. To capture these properties I define the lexical entry in (252).

(252) Lexical entry #1 for \( \text{=t(aj)} \)

\[
\lambda_s. (\#_a_j, s); \\
S \rightarrow S; \\
\lambda_K. \text{NOT} K
\]
where \( #_{i_{aj_1}} s \) is defined as follows:

\[
#_{i_{aj_1}} s = \text{def} \tos ((\text{fst} s)\#{a_j} \cdot (\text{rst} s))
\]

I begin by explaining how the tecto and the semantics of (252) work, and unpack its pheno afterwards. In the tecto, (252) takes as argument an expression of type S and returns an expression of the same type.\(^{29}\) In the semantics, \( K : k \) stands for the dynamic meaning of the sentence. The constant \( \text{NOT} \), defined in (253) below, is the counterpart of the dynamic negation operator in the extended DyCG. In the first component of the tuple in (253), not existentially binds any DRs in its scope and then negates that proposition. The second component of the tuple carries over the effect of the argument proposition on the TUD-stack.

(253) \( \text{NOT} = \text{def} \lambda_{k:k}.\lambda_{d:c}.\lambda_{x:y}.\langle \text{not exists}_{y:y}.\pi_1 (k \cdot d \cdot x \cdot y), \pi_2 (k \cdot d \cdot x \cdot y) \rangle \)

where \( \text{not} : p \rightarrow p \) is the (static) propositional negation and \( \text{exists} : (A \rightarrow p) \rightarrow p \) is the (static) existential quantifier (\( A \) ranges over meaning types).

Unpacking the pheno of (252) calls for additional details about the types and the operations used in phenogrammar. To begin with, I introduce a distinction between two basic types: \( p \) for prosodic words and \( c \) for clitics. In the definition of \( #_{i_{aj_1}} s \), I use the function \( \tos : p \rightarrow s \) (abbreviates to-string) which maps every prosodic word to the length-one string containing that prosodic word.\(^{30}\) I write prosodic words (and clitics) in typewriter font to notationally distinguish a prosodic word \( p \) from the length-one string containing that prosodic word, i.e., \( \tos p \). The type \( s \) for strings I have used so far is actually a shorthand for \( \text{str} p \). In other words, the pheno constants we have seen so far can, in fact, be conceived of as strings of prosodic words (possibly of length one). For example, araul is the length-one string containing the prosodic word araul.

\(^{29}\)This treatment of negation overgenerates as it does not disallow negation to apply more than once.

\(^{30}\)The function \( \tos \) is, in fact, shorthand for \( \eta_p : p \rightarrow s \) where \( \eta_A : A \rightarrow \text{str} A \) is the unit natural transformation of the string monad which maps a term of type \( A \) to a term of type \( \text{str} A \).
In addition, the definition of \( \#_{taj_1}s \) employs two string-manipulation functions: \( \text{fst}: s \rightarrow p \) and \( \text{rst}: s \rightarrow s \), which are defined only for non-null strings. The function \( \text{fst} \) (abbreviates first) returns the first prosodic word of a string. The function \( \text{rst} \) (abbreviates rest) returns the string itself minus the first prosodic word. To the output of the \( \text{fst} \) function, \( t(a_j) \) (type c) is cliticized via the encliticization operator \( \# : p \rightarrow c \rightarrow p \), written infix.\(^{31}\) Then, the result is turned into a string by the \( \text{tos} \) function. Finally, the result of the \( \text{tos} \) function is concatenated with \( \text{rst} s \), the argument string minus its first prosodic word.

Based on the lexical entry for negation in (252) and the ones in (255), which were defined in chapter 3, the derivation of (254) is given in (256).

(254) \( x-\emptyset-\text{war}=t \) a Raul.
\( \text{CMP-A3-\text{sleep}=\text{NEG CLF Raul} } \)
‘Raul didn’t sleep.’

(255) a. \( \vdash \lambda_s. \text{ xwar} \cdot s \cdot ; \text{NP } \rightarrow \text{ S } ; \text{ SLEEP } \)

b. \( \text{SLEEP} =_{\text{def}} \lambda n. \lambda c;c>n. \lambda c|c|. (\text{sleep } x_w, [\ ] ) \)

c. \( \vdash \lambda_f. f \text{ aral } ; \text{QP } ; \text{ RAUL } \)

d. \( \text{RAUL} =_{\text{def}} (\text{THE NAMED-RAUL} ) \)

e. \( \text{THE} =_{\text{def}} \lambda D. \lambda E. \lambda c. E \text{ (the } D \text{ c) c} \)

\( \vdash \lambda_f. f \text{ aral } ; \) \( \vdash \lambda_s. \text{ xwar} \cdot s ; \)
\( \text{QP } ; \quad \text{NP } \rightarrow \text{ S } ; \quad \text{ SLEEP } \quad \text{MP} \)
\( \vdash \lambda_s. (\#_{taj_1}s) ; \)
\( \text{RAUL } ; \quad \text{SLEEP } \quad \text{MP} \)
\( \vdash \text{ xwar} \cdot \text{ arul } ; \) \( \vdash \lambda K. \text{ NOT } K ; \)
\( \text{RAUL SLEEP } \quad \text{MP} \)
\( \vdash \text{ xwar} #(a_j) \cdot \text{ arul } ; \) \( \vdash \lambda_K. \text{ NOT } K ; \)
\( \text{NOT (RAUL SLEEP) } \)

\(^{31}\)The current analysis does not capture the fact that the phonological realization of \( =t(a_j) ‘\text{NEG}’ \) is sensitive to prosodic boundaries. A more adequate analysis would incorporate prosodic information in the phenogrammar to capture not only the distribution but also the phonological realization of \( =t(a_j) ‘\text{NEG}’ \).
In (256), we first form the sentence to be negated by combining a Raul ‘Raul’ of type QP with the verb xwar ‘s/he slept’. Next, =t(aj) ‘NEG’ applies to the sentence and attaches the clitic τ(aj) to its first prosodic word. In the semantics of the full sentence, the dynamic negation operator NOT outscopes the proposition RAUL SLEEP.

The phenogrammatical derivation in the second MP step of (256) is given in (257). Here, we apply the pheno of (252) to the pheno of its argument. The function fst applies and maps the length-two string xwar · araul to its first prosodic word, namely xwar. Next, we encliticize τ(aj) to the latter and get back the prosodic word xwar#τ(aj), which is then turned into a string by the tos function. To the output of the tos function, we concatenate (rst xwar · araul), which is araul, and obtain the pheno of the sentence.

\[
(\#_{\text{adj}} \text{xwar} \cdot \text{araul}) = \text{tos}((\text{fst} \text{xwar} \cdot \text{araul})#\tau(\text{aj})) \cdot (\text{rst} \text{xwar} \cdot \text{araul})
\]

\[
= \text{tos}(\text{xwar}\#\tau(\text{aj})) \cdot \text{araul}
\]

\[
= \text{xwar}\#\tau(\text{aj}) \cdot \text{araul}
\]

The reduction of the semantic term in the root label of (256) is given in (258).

\[
\text{NOT (RAUL SLEEP)}
\]

\[
= \text{NOT (λc. SLEEP (the NAMED-RAUL c) c)}
\]

\[
= \text{NOT (λc. (λd,c)(the NAMED-RAUL c) \; λx{|c; λx{|c; sleep x the NAMED-RAUL c} ; [1]} c))}
\]

\[
= \text{NOT (λc. (the NAMED-RAUL c) \; λx{|c; λx{|c; sleep x the NAMED-RAUL c} ; [1]} c))}
\]

\[
= λd.κ.λx{|c; λx{|c; not exists}_k.π_1 (k d x, y), π_2 (k d x, y)} (λc. (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
= \text{NOT (λc. (the NAMED-RAUL c) \; λx{|c; not exists}_k.π_1 (k d x, y), π_2 (k d x, y)} (λc. (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])}
\]

\[
= λd.ρ.κ.λx{|c; not exists}_k.π_1 (\lambda c. c (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
= λd.ρ.κ.λx{|c; not exists}_k.π_1 (\lambda c. c (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
= λd.ρ.κ.λx{|c; not exists}_k.π_1 (\lambda c. c (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
= λd.ρ.κ.λx{|c; not exists}_k.π_1 (\lambda c. c (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
= λd.ρ.κ.λx{|c; not exists}_k.π_1 (\lambda c. c (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
= λd.ρ.κ.λx{|c; not exists}_k.π_1 (\lambda c. c (the NAMED-RAUL c) \; λx{|c; sleep x the NAMED-RAUL c} ; [1])
\]

\[
155
\]
Having discussed how negation in basic declarative sentences is captured, I now turn to the analysis of negation in answer FCs in K‘iche’.

4.5.2 Negation in long answer FCs in K‘iche’

In negated long answer FCs in K‘iche’, we need to capture the fact that the placement of =t(aj) ‘NEG’ is variable so long as it encliticizes to a prosodic word in the pre-predicate expression. In addition, we want negation in semantics to be propositional. To this end, I define the lexical entry in (259) which captures the distribution and interpretation of =t(aj) ‘NEG’ in long answer FCs.

(259) Lexical entry #2 for =t(aj) $\vdash \lambda_q.\lambda_f. (\#_{taj} q f)$ ;

$$((NP \rightarrow S) \rightarrow F) \rightarrow (NP \rightarrow S) \rightarrow F ; \lambda_Q.\lambda_F. \text{NOT} (Q F)$$

where $\#_{taj} q f$ is defined as follows:

$$\#_{taj} q f =_{\text{def}} \begin{cases} \text{tos}((\text{fst} s)\#t(a_j)) \cdot (f e), & \text{if } |s| = 1 \\ \lambda_{a_j}.\exists_{m}.(m < n) \land s' = (\#_{taj m n} s) \cdot (f e), & \text{if } |s| > 1 \end{cases}$$

where $s = (q \lambda_{a_j} s)$, $|s| = n$, and for $0 \leq m < n$, $(\#_{taj m n} s)$ is the result of replacing the $m$-th prosodic word $p$ in $s$ by $p\#t(a_j)$ (indexing starts with 0).

As with the previous entry for =t(aj) ‘NEG’, I start by describing how the tecto and the semantics of (259) work. In the tecto, (259) takes as argument an expression of type $(NP \rightarrow S) \rightarrow F$, which corresponds to the tecto of the focused expression, and an argument of type $(NP \rightarrow S)$, which corresponds to the tecto of the continuation of the focused expression, to yield an expression of type $F$.\footnote{As we have seen in §4.2.2, the set of expressions that can occur in the pre-predicate focus position is diverse The lexical entry in (259) should be schematized such that its tecto would be $(A \rightarrow S) \rightarrow F) \rightarrow (A \rightarrow S) \rightarrow F$, where the metavariable $A$ ranges over the type of expressions that can be focused in K’iche’. Here, I’m simplifying the exposition by only considering the cases where the focused expression is of type QP and thus $A = NP$.} In the semantics, NOT applies to the proposition obtained by applying the meaning of the focused expression, $Q$, to the meaning of its continuation, $F$.\footnote{As we have seen in §4.2.2, the set of expressions that can occur in the pre-predicate focus position is diverse The lexical entry in (259) should be schematized such that its tecto would be $(A \rightarrow S) \rightarrow F) \rightarrow (A \rightarrow S) \rightarrow F$, where the metavariable $A$ ranges over the type of expressions that can be focused in K’iche’. Here, I’m simplifying the exposition by only considering the cases where the focused expression is of type QP and thus $A = NP$.}
In the pheno of (259), \( q : (s \to s) \to s \) and \( f : s \to s \) are variables for the focused expression and its continuation, respectively. In the definition of \( \#_{ta_3} \) \( q \) there are two cases: the case where there is only one prosodic word in the focused expression and the case where there is more than one. The variable \( s \) stands for the string obtained by feeding \( \lambda s. s \) to \( q \), turning the latter into a string. If the length of \( s \) is 1, i.e., if \( |s| = (q \lambda s. s)| = 1 \), then there is only one prosodic word in the pre-predicate expression. In this case, we encliticize \( =t(a_j)'NEG' \) to the sole prosodic word of the focused expression by using \texttt{fst} and the cliticization operator described in the previous section, and turn the result into a string via \texttt{tos}. Finally, we concatenate \((f e)\), the pheno of the continuation which is fed the empty string, to the result of applying \texttt{tos} to get the pheno of the full sentence.

If \( |s| = (q \lambda s. s)| > 1 \), on the other hand, then there is more than one prosodic word in the pre-predicate expression and therefore more than one possible host for \( =t(a_j)'NEG' \). To capture the variable distribution of \( =t(a_j)'NEG' \) in these cases, I define the function \((\#_{ta_m,n} s)\) which, for \( 0 \leq m < n \), yields the result of encliticizing \( t(a_j) \) to the \( m \)-th prosodic word \( p \) in \( s \). Each such expression is then concatenated with \((f e)\) to yield the pheno of a full sentence. Note that, in the end, what the phenogrammar generates is a set of strings.\(^{33}\)

Given (259), the derivation of (260b)/(260c) is provided below where I use the lexical entries given in (261). I divide the proof into four parts for reasons of space.

\begin{align*}
(260) & \quad a. \text{Chi-k-e} \quad \text{me’s} \quad x-e-war-\text{ik} \\
& \quad \quad \text{PREP-E3P-GEN} \quad \text{cat} \quad \text{CMP-A3P-sleep-SS} \\
& \quad \quad \text{‘Which cats slept?’} \\
& \quad b. \text{Ri} \quad \text{saq} \quad \text{me’s} \quad \text{taj} \quad x-\emptyset-war-\text{ik}. \\
& \quad \quad \text{DET white} \quad \text{cat} \quad \text{NEG} \quad \text{CMP-A3-sleep-SS} \\
& \quad \quad \text{‘Not THE WHITE CAT.’}
\end{align*}

\(^{33}\)To account for the variable distribution of negation in answer FCs, the current analysis proposes to use set-valued phenos. This means that the concatenation that is used in the analysis after we obtain a set-valued pheno needs to be pointwise. In a more technically precise way of doing things, this can indeed be handled by the set monad for phenos. This monad makes available a rule that maps a pheno expression \( a \) of type \( A \) to an expression of type \( A \to t \), namely the set containing that expression. For example, for an expression of type \( s \), we would obtain a set of \( s \)'s. This monad also makes available the monadic function application rule for set-valued phenos to handle pointwise function application.
c. Ri  saq=t  me’s x-∅-war-ik.
   DET white=NEG cat  CMP-A3-sleep-SS
   ‘Not THE WHITE CAT.’

(261) a. ⊢ me’s ; N ; CAT

b. CAT = def λn.λc∈Cₙ,n.λx∈xₙ.〈cat xₙ, [ ]〉

c. ⊢ λₜ.saq·s ; N −→ N ; WHITEatt

d. WHITEatt = def λD.λn.(WHITEprd n) AND (D n)

e. ⊢ λₜf.f (#ₜ s) ; N −→ QP ; THE , where (#ₜ s) = def tos(ri#(fst s))·(rst s)

Before going into the analysis of (260b,c), a note about the determiner ri ‘DET’, which I analyze as a proclitic. This analysis is motivated by two interrelated facts. The first is that ri ‘DET’ cannot host =t(aj) ‘NEG’ which shows that it is phonologically lighter than a prosodic word. Second, function words like ri ‘DET’ tend to prosodically incorporate into their arguments (Larsen, 1988; López Ixcoy, 1997; Henderson, 2012). Therefore, I model ri ‘DET’ by using the lexical entry in (261e), where the clitic ri procliticizes to the first prosodic word of its argument using the tos, fst, and rst functions defined previously. They way that ri ‘DET’ attaches to its host is analogous to the way =t(aj) ‘NEG’ in (252) attaches to its host except that the former uses procliticization rather than encliticization.

Next, I turn to the analysis of (260b,c). In the proof in (262), we form the expression to be focused by using the lexical entries in (261).

(262) ⊢ λₜ.saq·s ; ⊢ me’s ;
   N −→ N ; N ;
   WHITEatt CAT MP

   ⊢ λₜf.f (#ₜ s) ; ⊢ saq·me’s ;
   N −→ QP ; N ;
   WHITEatt CAT

   ⊢ λₜ.f (f ri#saq·me’s) ;
   THE QP ;
   THE WHITEatt CAT

Next in (263), we form the focused expression by applying laf, the long answer focus operator, to the result of the proof above.
Phenogrammatic derivation at the level of the full sentence is provided in (266). Note that the pheno generates a set of strings with two elements capturing the variable distribution of $=_t(\text{aj})$ 'NEG' in (260).

\[
(#_{taj} \lambda_f. \text{ri}\#\text{saq} \cdot \text{me's} \cdot (f \ e)) \cdot (\lambda_g. \text{xwarik} \cdot s \ e)
\]

\[
= \lambda_{g'}. \exists m, (m < 2) \land s' = #_{tajn_2} (\text{ri}\#\text{saq} \cdot \text{me's} \cdot (\lambda_g. \text{xwarik} \cdot s \ e))
\]

\[
= \lambda_{g'}. \exists m, (m < 2) \land s' = #_{tajn_2} (\text{ri}\#\text{saq} \cdot \text{me's}) \cdot \text{xwarik}
\]

\[
= \{\text{ri}\#\text{saq}#t(\text{aj}) \cdot \text{me's} \cdot \text{xwarik}, \text{ri}\#\text{saq} \cdot \text{me's} \cdot #t(\text{aj}) \cdot \text{xwarik}\}
\]
Before concluding this section, I consider the analysis of negative answers to negative questions exemplified in (267b,c), answers to the negative question in (267a). In these answers, there are two negators: one attached to the pre-predicate expression or a subexpression thereof, and the other to the predicate.

(267) a. Chi-k-e m’e x-e-war taj?
PREP-E3P-GEN cat CMP-A3P-sleep NEG
‘Which cats didn’t sleep?’

b. Ri saq me’s taj x-Ø-war taj.
DET white cat NEG CMP-A3-sleep NEG
‘Not THE WHITE CAT.’

c. Ri saq=t m’e x-Ø-war taj.
DET white=NEG cat CMP-A3-sleep NEG
‘Not THE WHITE CAT.’

The derivation of (267b)/(267c) is given in (268) where the pre-verbal part of the sentence is the one obtained in the derivation for (260). Note that the difference in scope of the two negation operators can be seen in the dynamic meaning at the level of the full sentence: the negation in the preverbal domain outscopes the whole sentence while the negation in the verbal domain has narrow scope.

(268) \[
\vdash \lambda_f.(\#_{\text{taj}} \lambda_f.\text{ri\#} \text{saq}\cdot \text{m’e}\cdot (f\ e))\cdot (f\ e);
\]
\[
\vdash \lambda_x.\text{xwar\#} \text{t(aj)}\cdot s;
\]
\[
\vdash (\#_{\text{taj}} \lambda_f.\text{ri\#} \text{saq}\cdot \text{m’e}\cdot (f\ e))\cdot (\lambda_x.\text{xwar\#} \text{t(aj)}\cdot s)\cdot F;
\]
\[
\vdash (\#_{\text{taj}} \lambda_f.\text{ri\#} \text{saq}\cdot \text{m’e}\cdot (f\ e))\cdot (\lambda_x.\text{xwar\#} \text{t(aj)}\cdot s)\cdot (\lambda_x.\text{NOT} (\text{SLEEP}_n) c)\cdot [\text{\ }]\);
\]
\[
\vdash (\#_{\text{taj}} \lambda_f.\text{ri\#} \text{saq}\cdot \text{m’e}\cdot (f\ e))\cdot (\lambda_x.\text{xwar\#} \text{t(aj)}\cdot s)\cdot (\lambda_x.\text{NOT} (\text{SLEEP}_n) c)\cdot [\text{\ }]\);
\]
\[
\vdash (\#_{\text{taj}} \lambda_f.\text{ri\#} \text{saq}\cdot \text{m’e}\cdot (f\ e))\cdot (\lambda_x.\text{xwar\#} \text{t(aj)}\cdot s)\cdot (\lambda_x.\text{NOT} (\text{SLEEP}_n) c)\cdot [\text{\ }]\);
\]

In the next section, I turn to the analysis of negative short answer FCs in K’iche’.

4.5.3 Negation in short answer FCs in K’iche’

As short answer FCs do not take as argument the continuation of the focused expression like long answer FCs do, we need a new entry for negation in short answer FCs, which is given in (269).
(269) Lexical entry #3 for =t(aj) ⊢ \lambda_{\#taj s}. F \rightarrow F ; \lambda_{K}. \text{NOT } K

where \#taj s is defined as follows:

\[
\#_{taj} s =_{def} \begin{cases} 
\text{tos}((\text{fst } s)\#t(a j)), & \text{if } |s| = 1 \\
\lambda_{s'}\exists m. (m < n) \land s' = (\#_{taj_{m,n}} s), & \text{if } |s| > 1
\end{cases}
\]

where |s| = n, and for 0 ≤ m < n, (\#_{taj_{m,n}} s) is the result of replacing the m-th prosodic word p in s by p\#t(a j) (indexing starts with 0).

In the pheno of (269), s : s is for the focused expression. In the tecto, the negation entry takes as argument an expression of type F and yields an expression of type F. In the semantics, the dynamic negation operator NOT applies to K, the dynamic meaning of the focused expression. Note that the difference between (269) and (259) is that in (259), the continuation of the focused expression is concatenated to the result of encliticizing =t(taj) ‘NEG’ to a prosodic word of the focused expression whereas in (269), the continuation is not taken as an argument. In addition, in (269), the pheno of the argument of negation, namely the focused expression, is already a string so no vacuity is fed to it for the string-manipulation functions to apply.

Given the lexical entry in (269), the derivation of the short answer in (270b) is given below in (271). Observe that lexical the entry for =t(taj) ‘NEG’ given in (269) corresponds to the English not in the translation ‘Not RAUL’ in (270b) which cannot be used in long answers (cf. Not RAUL (*slept).)

(270) a. Chin x-∅war-ik?
   who CMP-A3-sleep-SS
   ‘Who slept?’

   b. A Raul taj.
   CLF Raul NEG
   ‘Not RAUL.’
Recall that in §3.4.6, I analyzed aree FCs as yielding an expression of tectotype S. In addition, in §4.2.2, I showed that in aree FCs, \( =t(aj) \) ‘NEG’ attaches to the first prosodic word of the sentence, namely aree ‘FOC’. Thus, to negate an aree FC, we can simply use the negation entry defined in §4.5.1 in (252) which takes an expression of type S to yield an expression of type S and attaches \( =t(aj) \) ‘NEG’ to the first prosodic word of the sentence. Since this analysis does not involve a new lexical entry for \( =t(aj) \) ‘NEG’, I will not provide an example derivation here.

This concludes the formal analysis of negation in K’iche’. In the next section, I provide a summary and discuss the desirable characteristics of the analysis proposed in this chapter.

### 4.5.4 Negation in aree FCs in K’iche’

The analysis of negation developed in this chapter captures the distribution and interpretation of negation in K’iche’ in both basic declarative sentences and in answer and aree FCs in a formally precise way. A desirable characteristic of the analysis is that it handles string formation and semantic composition in tandem where linguistic expressions are put together via explicit and fundamental operations provided by the proof theory. In particular, the distribution of \( =t(aj) \) ‘NEG’ is captured explicitly in the phenogrammar while the interpretation of negated sentences, which invariably involves propositional negation, is dealt with in the semantic component. This analysis is superior to previous accounts in the literature which fail to adequately capture the distribution of negation.

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in K’iche’ or posit the vague idea of “constituent-negation.” The analysis shows explicitly how linguistic expressions are combined to yield the desired meaning compositionally, which cannot be attained in an analysis which does not concern itself with both string formation and meaning composition.

Based on the distribution of =t(aj) ‘NEG’, the current analysis posited a main distinction between negation in answer FCs on one hand and negation in basic declarative sentences and aree FCs on the other. In particular, the variable distribution of negation can only be seen when there is more than one prosodic word in the pre-predicate expression in answer FCs. Alongside the language-internal motivations in K’iche’, it is interesting to see that other members of the Mayan family make similar distinctions. For example, Kockelman (2003) notes that Q’eqchi’ has two negation morphemes: (i) ink’a’ ‘NEG’ for negation in simple declaratives, and (ii) moko...ta ‘NEG’ for negation in focus sentences. Similarly, according to England (1983a), Mam has a number of different negative particles which are in complementary distribution. In particular, the marker miti’, which is used to negate declarative sentences with verbal predicates cannot be used to negate focus sentences and declaratives formed with stative predicates. The latter require the particle miyaa’. Outside of Mayan, Kroeger (2014) shows that in Malay/Indonesian, there are two negation morphemes: one for negation in simple declaratives with verbal predicates, and the other for negation in contrastive sentences and narrow focus sentences. The analysis of negation in K’iche’ proposed in this chapter suggests that K’iche’ makes a similar distinction despite using homophonous negation morphemes across different sentence types.

Before concluding this section, I return to the issue I discussed in §4.2.3, namely the relation between the analyses of answer FCs and that of negation. Recall that, traditionally, focus constructions in Mayan received monoclausal analyses, e.g., Aissen’s (1992) analysis where the focused expression occupies [Spec, IP] and binds a co-indexed trace. There also have been proposals to analyze focus constructions as having a biclausal structure, either because the fronted expression is in a higher clause (Larsen, 1988) or because the focused expression is a non-verbal predicate taking the post-focal expression as argument (Bricker, 1979; Bohnemeyer, 2002; Tonhauser, 2003b,c).
As I noted in §4.2.3, the analysis of answer FCs proposed in chapter 3 can also be seen as a biclausal analysis in the following sense: in a focus construction, the main clause is an F, and the embedded clause, which is missing an NP, is an NP $\rightarrow$ S. Thus, the biclausality stems from the particular analysis of answer focus constructions: the construction consists of a focused expression which is type-raised over its own continuation. In this analysis, we call the type-raised expression a predicate which is predicated of its continuation. Given that there are two clauses, there can conceivably be a negator for each. Note that no matter what the particular analysis of focus constructions is: a monoclausal or a biclausal analysis, and what counts as the main predicate in a biclausal analysis, one still needs to account for the fact that when the predicate (in either of the senses above) is a focused expression, negation has a variable distribution in K’iche’.

At this point, one could ask the following question: if, in general, answers are analyzed as having a biclausal structure in the sense used in this thesis, why do we not see an analogous effect of negation in English? The answer is that, as I argued in §4.4.3, English does not have long negative answers, i.e., nothing that corresponds to, say, (267b,c). Put differently, English does not have a negation morpheme that is analogous to the =t(aj) ‘NEG’ used in long answer focus constructions in K’iche’.
Chapter 5

Polar questions in K’iche’

In this chapter, I discuss two kinds of polar questions in K’iche’: broad focus polar questions and narrow focus polar questions. I begin with a discussion of the two ways in which broad focus polar questions are formed and the form that their answers take. In K’iche’, as in languages like Finnish (Holmberg, 2001), Irish (McCloskey, 1991), Russian (King, 1994), and Welsh (Sadock & Zwicky, 1985), answers to broad focus polar questions are formed by repeating or negating the verbal or non-verbal predicate in question.

After covering the basics about broad focus polar questions, I turn to negative polar questions and, in particular, discuss the ambiguity that is exhibited by such questions, namely the inner and outer negation interpretations (e.g., Ladd 1981; Büring & Gunlogson 2000; Han & Romero 2004). It has been noted that a negative polar question like *Isn’t Jane coming?* can be understood as a question about the negative proposition *Jane isn’t coming*, which corresponds to the inner negation interpretation. This is the interpretation where the speaker wants to double-check the negative proposition *Jane isn’t coming* after facing evidence against the truth of the proposition *Jane is coming*. The same question can also be understood as a question about the positive proposition *Jane is coming*, which corresponds to the outer negation interpretation. This is the interpretation where the speaker wants to confirm or double-check the positive proposition *Jane is coming*. I show that the interpretation of negative polar questions in K’iche’ gives rise to the same ambiguity. Furthermore, I show that, similar to languages like English and German (e.g., Ladd, 1981; Büring & Gunlogson, 2000), this ambiguity has a morphosyntactic reflex.

Next, I discuss narrow focus polar questions, namely polar questions with a focused expression in the preverbal position. In contradistinction to broad focus polar questions, narrow focus polar
questions cannot be answered by repeating or negating the verbal or non-verbal predicate in question. Rather, their answers take the form of the repetition and/or pronominalization of the expression in the focus position or the negation thereof. After discussing the interpretation of narrow focus polar questions, I take up the relevance of inner versus outer negation to the interpretation of negative narrow focus polar questions. In particular, I show that the distribution of negation in narrow focus polar questions is sensitive to the inner versus outer negation interpretations: negation occurs in the preverbal domain if the question has an outer negation interpretation while it occurs in the verbal domain if the question has an inner negation interpretation. Consequently, the distribution of negation in narrow focus polar questions proves to be another morphosyntactic reflex of the inner/outer negation ambiguity in K’iche’.

I conclude this chapter by augmenting the K’iche’ fragment with an analysis of broad focus polar questions and narrow focus polar questions and their answers.

5.1 Broad focus polar questions and answers in K’iche’

Broad focus polar questions in K’iche’ are formed in two different ways. The first way involves using the question particle *la* (or *laa* or *a*) ‘Q’ (Mondloch, 1978; Larsen, 1988; Trechsel, 1993; López Ixcoy, 1997), which occurs sentence-initially, together with a final rise, as exemplified in (272b), the polar question counterpart of (272a). Polar question particles similar to *la* ‘Q’ are described as clitics in other Mayan languages, e.g., in Mam (England, 1983a) and in Tzotzil (Aissen, 1987). In §5.3, I provide data to show that the particle *la* ‘Q’ in K’iche’ is also a clitic.

(272) a. K-at-b’ee-k.
   ICP-A2-go-SS
   ‘You are going.’

   b. La k-at-b’ee-k?
      Q    ICP-A2-go-SS
      ‘Are you going?’
Recall from chapter 1 that when both the topic and the focus positions are occupied, the topicalized expression precedes the focused expression. In such sentences with two preverbal expressions, *la* ‘Q’ follows the topicalized expression and precedes the focused expression, as shown in (273).

(273) Context: Raul and Roberto are organizing a party and Raul is double-checking who is bringing what. He asks:

\[(* La) al Maria la kinaq k-∅-u-k’am lo-q?\]
\[Q CLF Maria Q beans CMP-A3-E3-take DIR-SS\]
\[‘Is MARIA_CT bringing BEANSF?’\]

The second way of forming broad focus polar questions in K’iche’ involves a final rising intonation without the question particle *la* ‘Q’. This polar question forming strategy has been reported for several other Mayan languages, e.g., Jakaltek (Craig, 1977), Sakapultek (DuBois, 1981), Mam (England, 1983a), Chontal (Knowles, 1984), Tzotzil (Aissen, 1987), Itzaj Maya (Hofling & Tesucún, 2000), and Tzeltal (Brown, 2010; Shklovsky, 2012). Despite the existence of two different ways of forming polar questions in K’iche’, the way that answers are formed does not depend on which polar question forming strategy is used.

As regards answers to broad focus polar questions in Mayan, it has been claimed that they typically take the form of repeats rather than a ‘yes/no’ answer. For example, Brown (2010:2640) notes that in Tzeltal, a Mayan language spoken in Chiapas, Mexico, repeats are the default form of an affirmative answer to polar questions. Similarly, Bohnemeyer (2002:110) claims that in Yucatec, affirmative answers to polar questions take the form of repeats in that they involve the repetition of the predicate in the question. According to Bohnemeyer, the most natural way to confirm, say, (274a) is by repeating the predicate (274b) and the most natural affirmative answer for (275a) is (275b).

---

1 According to Craig (1977), rising intonation is the only feature that distinguishes polar questions from the corresponding declarative sentences in Jakaltek.

2 Sadock & Zwicky (1985) describe languages where repetitions are used to answer polar questions as having an *echo system*.
(274) a. K’ah-a’n wáah têech ba’x àanyo-i’?
   recall-RES ALT you what year-D4
   ‘Do you recall what year it was?’

   b. K’ah-a’n!
   recall-RES
   ‘I remember.’

   Bohnemeyer (2002:109)

(275) a. H lúub wáah túun le nuxib lóobo-o’?
   CMP fall(A3) ALT CON DET old:male wolf-D2
   ‘So, did that mean old wolf fall?’

   b. H lúub-ih.
   CMP fall-A3
   ‘It fell.’

   Bohnemeyer (2002:109)

As for K’iche’, López Ixcoy (1997) notes that a positive answer can be given by jee’ ‘yes’ and a negative answer by ja’i’ or maj ‘no’. The consultants I worked with use jee’ ‘yes’ in affirmative answers as in (276b) and (277b), alongside the repetition of the predicates in the question as in (276c) and (277c). However, they do not use ja’i’ which López Ixcoy claims can be used as a negative answer. As for maj, my consultants translate it as ‘nothing’, ‘doesn’t exist’ or ‘zero’ (but not as ‘no’), and do not use it in negative answers to polar questions. Instead, negative answers to polar questions in the data I collected all involve negating the verbal or non-verbal predicate as illustrated in (276d) and (277d).

(276) a. 0-chom?
   A3-fat
   ‘Is s/he fat?’

   b. Jee’.
   yes
   ‘Yes.’

   c. 0-chom.
   A3-fat
   ‘Yes.’

   d. 0-chom taj
   A3-fat NEG
   ‘No.’
(277) a. X-at-alax pa Kob’an?
   CMP-A2-be.born PREP Coban
   ‘Were you born in Coban?’

   b. Jee’.
      yes
      ‘Yes.’

c. X-in-alax-ik.
   CMP-A1-be.born-SS
   ‘Yes.’

d. X-in-alax taj.
   CMP-A1-be.born NEG
   ‘No.’

As the data in (278e) and (278f) show, when the predicate contains more than one prosodic word, the distribution of negation is variable in negative answers to polar questions, a pattern predicted by the analysis of the distribution of negation in answers that I developed in chapter 4.

(278) a. At-ri’j achi?
   A2-old man
   ‘Are you an old man?’

   b. Jee’.
      yes
      ‘Yes.’

c. In-ri’j achi.
   A1-old man
   ‘Yes.’

d. In-ri’j=t achi.
   A1-old=NEG man
   ‘No.’

e. In-ri’j achi taj.
   A1-old man NEG
   ‘No.’

f.#Achi.
   man
   (intended) ‘Yes.’
Having described the way broad focus polar questions and answers are formed in K’iche’, I turn to a discussion of inner and outer negation in negative polar questions.

5.2 Inner and outer negation in negative polar questions in K’iche’

It has been noted that the interpretation of negative polar questions gives rise to an ambiguity which, in some languages, e.g., English and German, has a morphosyntactic reflex (e.g., Ladd, 1981; Büring & Gunlogson, 2000). In this section, I show that the interpretation of negative polar questions in K’iche’ is also ambiguous and has a similar morphosyntactic reflex. In §5.3.2, I will show that the distinction between inner and outer negation interpretations is also related to the distribution of negation in negative narrow focus polar questions.

To illustrate the ambiguity exhibited by negative polar questions, I start with the examples in English below from Ladd 1981. In (279), Bob uses the negative polar question in a situation where he used to think that there is a vegetarian restaurant in the area, but based on what Kathleen says he is faced with evidence to the contrary and wants to check if he should change his mind. In (280), on the other hand, Kathleen thinks that there is a vegetarian restaurant and uses the negative polar question to ask for confirmation. Ladd calls the former interpretation of the negative polar question inner negation and the latter outer negation. The terms inner and outer negation are aimed to capture the intuition that Ladd had about negative polar questions in that with an inner negation polar question (INPQ), negation is somehow part of the proposition being questioned whereas with an
outer negation polar question (ONPQ), negation is outside of the proposition begin questioned. Put differently, a negative polar question can be understood as a question about \( \neg p \), which corresponds to inner negation, or as a question about \( p \), which corresponds to outer negation (Han & Romero, 2004).

(279) Context: Bob is visiting Kathleen and Jeff in Chicago while attending CLS.

Bob: I’d like to take you guys out to dinner while I’m here – we’d have time to go somewhere around here before the evening sessions tonight, don’t you think?

Kathleen: I guess, but there’s not really any place to go to in Hyde Park.

Bob: Oh, really, isn’t there a vegetarian restaurant around here?

Kathleen: No, about all we can get is hamburgers and souvlaki.

(280) Context: Kathleen and Jeff have just come from Chicago on the Greyhound bus to visit Bob in Ithaca.

Bob: You guys must be starving. You want to get something to eat?

Kathleen: Yeah, isn’t there a vegetarian restaurant around here – Moosewood, or something like that?

Bob: Gee, you’ve heard about Moosewood all the way out in Chicago, huh? OK, let’s go there.

In the next section, I discuss the morphosyntactic reflexes of inner and outer negation.

5.2.1 Morphosyntactic reflexes of the ambiguity in negative polar questions

In English, one of the ways which can be used to disambiguate INPQs from ONPQs has to do with the distribution of the positive polarity item *some* and the negative polarity item *any*. With *some* in (281a), only an outer negation interpretation is possible whereas with *any* in (281b), the only possible interpretation is that of inner negation.
(281)  a. Aren’t there some vegetarian restaurants around here?

    b. Aren’t there any vegetarian restaurants around here?

A similar observation is made for the positive polarity item too and the negative polarity item either. According to Han & Romero (2004:611), in (282), where the polar question has an outer negation interpretation, the speaker is trying to confirm or double-check the positive proposition $p$, namely, that Jane is coming, while presupposing the truth of a parallel affirmative proposition (here, that Stephan has come). On the other hand, in (283), where the polar question has an inner negation interpretation, the speaker wants to double-check $\neg p$, namely, that Jane is not coming, while presupposing the truth of a parallel negative proposition (here, that Pat is not coming). Han & Romero claim that the speaker originally believed or expected $p$ to be the case in both of the questions. The difference is that she wants to double-check $p$ in (282) whereas she wants to double-check $\neg p$ in (283).

(282)  A: OK, now that Stephan has come, we are all here. Let’s go!

    S: Isn’t Jane coming, too?

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

    A: Pat is not coming. So we don’t have any phonologists in the program.

    S: Isn’t Jane coming, either?

According to Büring & Gunlogson (2000), German is another language which exhibits a morphosyntactic reflex of the contrast between inner and outer negation. Büring & Gunlogson point out that in German the sentential negation nicht ‘not’ and the indefinite article ein ‘a’ obligatorily amalgamate to kein ‘no’ (unless ein ‘a’ is accented). They note that in negative polar questions, both forms are possible. According to Büring & Gunlogson, the question with the non-amalgamated
negation in (284a) has the interpretation of outer negation whereas the question with the amalgamated negation in (284b) has the interpretation of inner negation.³

(284) a. Gibt es nicht ein vegetarisches Restaurant in dieser Ecke?
gives EXPL not a vegetarian restaurant in this corner
‘Isn’t there a vegetarian restaurant around here?’

  b. Gibt es kein vegetarisches Restaurant in dieser Ecke?
gives EXPL no vegetarian restaurant in this corner
‘Isn’t there a vegetarian restaurant around here?’

(adapted from Büring & Gunlogson, 2000)

K’iche’ is similar to English and German in that negative polar questions are ambiguous between an inner and outer negation interpretation. As illustrated in (285), a negative polar question is acceptable in a context where the asker thinks that some proposition \( p \) (here, that \( \text{Raul has a machete} \)) and wants confirmation, which triggers an outer negation interpretation. In (286), the same question is used in a context where the asker used to think that some proposition \( p \) (here, again, that \( \text{Raul has a machete} \)) but now is faced with evidence to the contrary and wants to know whether she should change her mind. This context triggers an inner negation interpretation.

(285) Context: You need a machete to cut down some plants. You think that Raul, your neighbor, has one and to make sure you ask his wife:

\[
\text{K’o=tx exist=NEG one E3-machete CLF Raul}
\]

‘Doesn’t Raul have a machete?’

(286) Context: You need a machete to cut down some plants. You had thought that Raul, your neighbor, had a machete but his brother told you that he doesn’t. To make sure, you ask his wife:

\[
\text{K’o=tx exist=NEG one E3-machete CLF Raul}
\]

‘Doesn’t Raul have a machete?’

³Büring & Gunlogson provide the translation \textit{Is there no/Isn’t there any vegetarian restaurant around here?} for both of the examples and it is not clear which one they intend to correspond to which question. Since they claim that (284a) has an outer negation interpretation and (284b) an inner negation interpretation, I use the same translation into English which is ambiguous between the two readings. Note that a similar morphosyntactic effect is seen in English when the question is plural as in (281) above.
K’o=t jun u-ch’ich’ a Raul?
exist=NEG one E3-machete CLF Raul
‘Doesn’t Raul have a machete?’

In addition, similar to English and German, the ambiguity exhibited by negative polar questions in K’iche’ has a morphosyntactic reflex. As (287) shows, with an ONPQ, ink’aj ‘some’ can be used whereas nijun ‘any’ cannot be. On the other hand, as (288) shows, with an INPQ ink’aj ‘some’ cannot be used whereas nijun ‘any’ can be.

(287) Context: Juan wants to buy some chickens. He believes that Raul has some chickens and would like to make sure before he talks to him. He asks Raul’s wife:

a. K’o=t ink’aj r-ak’ a Raul?
exist=NEG some E3-chicken CLF Raul
‘Doesn’t Raul have some chickens?’

b.#K’o=t nijun r-ak’ a Raul?
exist=NEG any E3-chicken CLF Raul
‘Doesn’t Raul have any chickens?’

(288) Context: Juan wants to buy some chickens. He had thought that Raul has some chickens but later was told that that’s not the case and so now he’s in doubt. He asks Raul’s wife:

a.#K’o=t ink’aj r-ak’ a Raul?
exist=NEG some E3-chicken CLF Raul
‘Doesn’t Raul have some chickens?’

b. K’o=t nijun r-ak’ a Raul?
exist=NEG any E3-chicken CLF Raul
‘Doesn’t Raul have any chickens?’

Having shown that the contrast between inner and outer negation has a morphosyntactic reflex in K’iche’, I move on to a discussion of the ambiguity that they exhibit and the analyses proposed to account for this ambiguity. I will revisit the issue of inner and outer negation polar questions when I discuss negative narrow focus polar questions in §5.3.2 and show that the distribution of negation in such questions provides another instance where the inner versus outer negation distinction has a morphosyntactic reflex in K’iche’.
5.2.2 The analysis of the ambiguity in negative polar questions

As noted above, the term inner negation captures the intuition that in INPQs, negation is somehow part of the proposition that is being questioned whereas in ONPQs, it isn’t. Put differently, the intuition is that with an INPQ, the speaker is asking ‘Is it the case that not p?’ whereas with an ONPQ, she is asking ‘Isn’t it the case that p?’, which suggests a scopal analysis of the ambiguity.

Romero & Han (2004) make a similar point in their analysis of negative polar questions. They argue that negative polar questions contain the so-called VERUM (or VERUM focus) discussed in Höhle 1992, which refers to the added emphasis on the truth value of the proposition in question. According to Höhle (1992:124-6), declarative sentences containing VERUM focus in German can be given paraphrases using ‘It is true that …’ or ‘It is the case that …’, which is exemplified in (289). In (289b) VERUM scopes over negation and in (290b) negation scopes over VERUM. Romero & Han argue that the ambiguity in negative polar questions is a similar scopal ambiguity. When negation outscopes VERUM, we obtain the ONPQ reading; when VERUM outscopes negation, we obtain the INPQ reading.

(289) A: Karl hat bestimmt nicht gelogen.
Karl has for-sure not lied
‘Karl surely didn’t lie.’

B: Karl HAT nicht gelogen.
Karl HAS not lied
‘It is true that Karl didn’t lie.’ (Höhle, 1992:113)

(290) A: Ich hoffe, dass Karl ihr zuhört.
I hope that Karl her-DAT listens
‘I hope that Karl listens to her.’

B: Aber Hanna denkt, er HOERT ihr nicht zu.
But Hanna thinks he LISTENS her-DAT not PART
‘But Hanna thinks that it is not true that he listens to her.’ (Höhle, 1992:124)

Similar to what Romero & Han claim for English, negative polar questions in K’iche’ can be given paraphrases using the word tzij ‘truth, certain’. For example, the polar question in (291a), which has an outer negation interpretation in the context in (291), can be paraphrased as in (291b).

(291a) trench has not lied
‘Trench surely didn’t lie.’

(291b) Trench HAT not lied
‘It is true that Trench didn’t lie.’ (Höhle, 1992:113)
The same polar question, which has an inner negation interpretation in the context in (292), can be paraphrased as in (292b). Crucially, the paraphrase in (291b) is not acceptable in the context in (292), and the one in (292b) is not acceptable in the context in (291), as (292c) and (291c) show, respectively.

(291) Context: On a cloudy day where it seems like it is going to rain, the kids decide to play mud soccer. Raul goes back home to take a nap and tells his friends to wake him up when it starts to rain. In a few hours, a friend of his calls and says that the game is canceled. Raul says (291a).

a. Su che? K-∅-u-b’an=t jab’?
   why ICP-A3-E3-make=NEG rain
   ‘Why? Isn’t it raining?’

b. Tzij taj k-∅-u-b’an jab’?
   truth NEG ICP-A3-E3-make rain
   ‘Isn’t it true that it’s raining?’

c. #Tzij k-∅-u-b’an=t jab’?
   truth ICP-A3-E3-make=NEG rain
   ‘Is it true that it’s not raining?’

(292) On a very hot day, the kids decide to go to the river. Suddenly, the sky gets dark and it seems like it is going to rain. So they cancel the plan and decide to wait for another day. Raul goes back home to take a nap. In a few hours, a friend of his calls and says that they are going to the river. Raul says (292a).

a. Tzij? K-∅-u-b’an=t jab’?
   truth ICP-A3-E3-make=NEG rain
   ‘Really? Isn’t it raining?’

b. Tzij k-∅-u-b’an=t jab’?
   truth ICP-A3-E3-make=NEG rain
   ‘Is it true that it’s not raining?’

c. #Tzij taj k-∅-u-b’an jab’?
   truth NEG ICP-A3-E3-make rain
   ‘Isn’t it true that it’s raining?’
Having discussed the scopal analysis of the ambiguity in negative polar questions, I turn to a discussion of narrow focus polar questions in K’iche’, namely those polar questions which have a focused expression in the preverbal focus position.

5.3 Narrow focus polar questions in K’iche’

In this section, I discuss the kind of polar questions in K’iche’ which have a focused expression in the preverbal focus position as exemplified in (293). I call these questions narrow focus polar questions, or NFPQs for short.

(293) (La) a Raul x-∅-b’e-k?
   Q  CLF Raul CMP-A3-go-SS
   ‘Did RAUL leave?’

In contradistinction to broad focus polar questions discussed in the previous sections, NFPQs cannot be answered by repeating or negating the verbal or non-verbal predicate in question. Rather, in addition to using jee’ ‘yes’ as in (294b), their answers take the form of the repetition and/or pronominalization of the expression in the focus position or the negation thereof. For example, a Raul ‘Raul’ in (294c) or are’ ‘he’ in (294d), with or without the focus particle aree ‘FOC’, function as affirmative answers to (294a). Negative answers to (294) are the negations of the affirmative ones, as illustrated in (294e,f,g,h). Repetition of the verbal predicate or its negation are not acceptable answers as (294i) and (294j) show, respectively.

(294) a. (La) a Raul x-∅-b’e-k?
   Q  CLF Raul CMP-A3-go-SS
   ‘Did RAUL leave?’

   b. Jee’.
   yes
   ‘Yes.’

4Among the three consultants that I worked with on polar questions, two of them used only pronominalized forms in the answers to narrow focus polar questions.
c. (Aree) a Raul.
   FOC CLF Raul
   ‘Yes.’

d. (Aree) are’.
   FOC he
   ‘Yes.’

e. Aree=t a Raul.
   FOC=NEG CLF Raul
   ‘No.’

f. Aree=t are’.
   FOC=NEG he
   ‘No.’

g. A Raul taj.
   CLF Raul NEG
   ‘No.’

h. Are’ taj.
   he NEG
   ‘No.’

i. #X-∅-b’e-k.
   CMP-A3-go-SS
   (intended reading) ‘Yes.’

j. #X-∅-b’e taj.
   CMP-A3-go NEG
   (intended reading) ‘No.’

Before going into the discussion of the interpretation of NFPQs in the next section, I illustrate the way in which NFPQs provide evidence for the clitic status of the particle la ‘Q’. As I noted in §5.1, similar polar question particles in other Mayan languages are described as clitics, e.g., in Mam (England, 1983a) and in Tzotzil (Aissen, 1987). As the data below show, la ‘Q’ behaves like a proclitic in K’iche’, similar to pa ‘prep’ or ri ‘DET’ whose behavior was discussed in §4.2.1. In (295c) and (295d), neither la ‘Q’ nor pa ‘PREP’ are possible hosts for the enclitic =t(aj) ‘NEG’ which, as discussed previously, requires a prosodic word as its host.
In the next section, I turn to a discussion of the interpretation of NFPQs.

### 5.3.1 Interpretation of narrow focus polar questions

The existence of narrow focus polar questions alongside broad focus polar questions raises some interesting issues in the grammar of K’iche’. One of these issues has to do with the possible difference in interpretation between a broad focus polar question like (296a) and its narrow focus counterpart in (296b).

(296) a. (La) pa tijob’al k-at-b’e wi?
   Q    PREP school ICP-A2-go PART
   ‘Did you go TO SCHOOL?’

   b. La pa tijob’al **taj** k-at-b’e wi?
   Q    PREP school NEG ICP-A2-go PART
   ‘Didn’t you go TO SCHOOL?’

   c. *La pa=t tijob’al k-at-b’e wi?*
   Q    PREP=NEG school ICP-A2-go PART

   d. *La=t pa tijob’al k-at-b’e wi?*
   Q=NEG PREP school ICP-A2-go PART

In the literature on NFPQs, it is typically claimed that such questions involve a division of the question into focus and an existential presupposition: the expression occupying a certain position or followed by a mobile clitic in the sentence is taken to be focused while the rest of the sentence becomes part of an existential presupposition (see Rudin et al. 1998 for Bulgarian and Russian; Vainikka 1989 for Finnish; King 1994 for Russian; Kuno 1980 for Turkish; Sadock & Zwicky 1985 for Latin). Shklovsky (2012) makes the same claim for Tzeltal and argues that the interpretation of NFPQs in Tzeltal is different from that of broad focus polar questions. In particular, he proposes
that the interpretation of NFPQs is a combination of the interpretation of polar questions and that of focus constructions à la Aissen (1992). He claims that the question in (297), for example, is used to ask whether Pedro ate the tortilla while presupposing that someone ate the tortilla.

(297) \textit{ja'-bal Pedro lah s-we’ me waj-e’?}  
\textit{FOC-Q Pedro CMP E3-eat DET tortilla-CL}  
\textit{‘Was it Pedro that ate the tortilla?’} \hspace{1cm} (Shklovsky, 2012:138)

For K’iche’, I argue for a different analysis than the one outlined above. In particular, given the difference in interpretation that I argued for between answer FCs and \textit{aree} FCs in K’iche’, I would predict that the corresponding polar questions would also have different interpretations. Since I argued that the kind of existence presupposition that is assumed in an Aissen-style analysis of focus constructions in Mayan only figures into the interpretation of \textit{aree} FCs in K’iche’, I would predict that such an implication would not figure into the analysis of narrow focus polar questions unless the focused expression is preceded by \textit{aree ‘FOC’}. Ideally, then, the difference between narrow and broad focus polar questions in K’iche’ could be accounted for without making recourse to an Aissen-style analysis of focus constructions.

The alternative analysis I pursue, which is along the same lines as the analysis proposed in Krifka 2017 for English, is the following: a narrow focus polar question like (296b) is acceptable in contexts where what is at issue is who left and the asker is interested in whether Raul is among those who did. The corresponding broad focus polar question in (296a), on the other hand, is acceptable in a context where the asker is interested in whether Raul left. As for narrow focus polar questions with \textit{aree ‘FOC’}, I predict them to be acceptable only in contexts where the existence presupposition triggered by \textit{aree ‘FOC’} is satisfied.

This alternative analysis of narrow focus polar questions in K’iche’ is supported by the following data. The example in (298) illustrates one type of context where narrow focus polar questions are acceptable, namely a context where there is no overt question but it is at issue whether someone has a particular property.\footnote{Krifka (2017) argues that a narrow focus polar question in English is acceptable in contexts where the corresponding constituent question is either asked or is accommodated. Based on the discussion I had in chapter 3 about the use of focus} For example, in a context like (298) where the issue of who was born in
Mexico is salient, consultants prefer the use of narrow focus polar questions as in (298a) as opposed to broad focus polar questions (298b).

(298) Context: Roberto is looking for people who were born in Mexico for an interview on dual citizenship. In a meeting, he explains this to a group of people from the community. Carlos, who is in the group, thinks that Raul, the new doctor, might have been born in Mexico. To the others in the group, he asks:

a. A Raul x-∅-alax pa Mexico?  
   CLF Raul CMP-A3-be.born PREP Mexico  
   ‘Was RAUL born in Mexico?’

b.?X-∅-alax pa Mexico a Raul?  
   CMP-A3-be.born PREP Mexico CLF Raul  
   ‘(intended) Was RAUL born in Mexico?’

The second type of context where narrow focus polar questions are acceptable are those where it is at issue whether someone or something has a particular property because a question to that effect has just been asked (and accepted), as illustrated in (299). Since the continuation of the focused expression in the polar question is the same as the continuation of the question word in the constituent question, it is common to elide it in the former.

(299) Context: Juana’s mother gets back from shopping for clothes for the family. Juana asks her what she got for her and then whether it is a dress.

Su x-∅-a-loq ch-w-e? Jun atzyaq (x-∅-a-loq ch-w-e)?  
what CMP-A3-e2-buy PREP-E1-GEN one dress CMP-A3-e2-buy PREP-E1-GEN  
‘What did you buy for me? A dress?’

As for narrow focus polar questions with aree ‘FOC’, the contrast between (300) and (301) shows that such questions are acceptable only in contexts where the existence presupposition of aree ‘FOC’ is satisfied. Possible answers to the questions in (300a) and (301a) are given in (300b,c,d,e) and (301b,c,d,e), respectively.

constructions in contexts without an interrogative, I leave the formal analysis of narrow focus polar questions in such contexts for future research.
(300) Context: Roberto recently came back to the community and wants to plant coffee. He thinks that there might still be some people who cultivate coffee and he is looking for someone who can lend him some seeds. He explains this to a group of friends. His friend Jorge asks (300a) to the others.

a. (#Aree) a Raul k-∅-u-tik kape?
   FOC CLF Raul ICP-A3-E3-plant coffee
   Does RAUL plant coffee?’

b. Are’.
   he
   ‘Yes.’

c. Are’ taj
   he NEG
   ‘No.’

(301) Context: Same as in (300) except that Roberto has been told that there is a person who continues to plant coffee. After he explains this to a group of friends, his friend Jorge, who believes that Raul plants coffee, asks (301a) to the others.

a. Aree a Raul k-∅-u-tik kape?
   FOC CLF Raul ICP-A3-E3-plant coffee
   Is it RAUL who plants coffee?’

b. Are’.
   he
   ‘Yes.’

c. Are’ taj
   he NEG
   ‘No.’

Having discussed the interpretation of narrow focus polar questions with and without aree ‘FOC’, I turn to a discussion of negation in narrow focus polar questions in K’iche’. 182
5.3.2 Negation in narrow focus polar questions

In this section, I examine the distribution and interpretation of negation in NFPQs. The distribution of negation in NFPQs is the same as its distribution in focus constructions in that $\neg t(aj)$ ‘NEG’ can occur in the preverbal domain as in (302a) or in the verbal domain as in (302b). This fact raises the question as to whether (302a) and (302b) are interpreted differently, just as the corresponding focus constructions are, as I discussed in chapter 4.

(302) a. A Raul $taj$ x-Ø-b’e-k?
   CLF Raul NEG CMP-A3-go-SS
   ‘Didn’t RAUL leave?’

   b. A Raul x-Ø-b’e $taj$?
   CLF Raul CMP-A3-go NEG
   ‘Didn’t RAUL leave?’

To get a feel for the potential difference between questions like (302a) and (302b), consider the examples in (303) and (304). According to my consultants, the positive answer in (303b)/(304b) means Raul left as an answer to (303a) while it means Raul didn’t leave as an answer to (304a). Similarly, the negative answer in (303c)/(304c) means Raul didn’t leave as an answer to (303a) while it means Raul did leave as an answer to (304a). We will shortly see that the difference in the interpretations of the answers is due to the fact that the distribution of negation affects the meaning of narrow focus polar questions which explains the consultants’ intuitions.

(303) a. A Raul $taj$ x-Ø-b’e-k?
   CLF Raul NEG CMP-A3-go-SS
   ‘Didn’t RAUL leave?’

   b. (Jee‘,) are‘.
      yes he
      ‘Yes (he did).’

   c. Are‘ $taj$.
      he NEG
      ‘No (he didn’t).’
As the data in (305) and (306) illustrate, the distribution of negation in narrow focus polar questions correlates with inner and outer negation interpretations. In (305), where the negative polar question has an outer negation interpretation, negation occurs in the preverbal part of the sentence. Here, the asker thinks that Raul got good grades and is asking to double check whether that is not the case.

(305) Context: A couple of teachers are talking about the results of an exam in Roberto’s math class. Juana asks (306a). Carlos believes that Raul, his younger brother, must have gotten a good grade since he is a good student. He asks (305b) to double check. (305c) is not acceptable in this context. To (305b), Roberto responds by (305d) if Raul did get a good grade and by (305e) if he didn’t.

a. Chin x-∅-r-esaj utz? who CMP-A3-E3-get good ‘Who got good grades?’

b. A Raul taj x-∅-r-esaj utz? CLF Raul NEG CMP-A3-E3-get good ‘Didn’t RAUL get good grades?’

c. #A Raul x-∅-r-esaj=t utz? CLF Raul CMP-A3-E3-get=NEG good ‘Didn’t RAUL get good grades?’

d. Are’. he ‘Yes (, he did).’
e. Are’ taj.
   he   NEG
   ‘No (, he didn’t).’

On the other hand, in (306), where the negative polar question has an inner negation interpretation, negation occurs in the preverbal part of the sentence. Here, the speaker believed that Raul must have gotten a good grade but after facing with evidence to the contrary, he is asking whether it is the case that Raul didn’t get a good grade.

(306) Context: A couple of teachers are talking about the results of an exam in Roberto’s math class. Juana asks (306a) and Roberto says (306b). Raul, Carlos’ younger brother, is known to be a good student so Carlos is surprised as he would have expected him to be successful. He asks (306c). In this context, (306d) is not acceptable. To (306c), Roberto responds by saying (306e).

a. Chin x-Ø-r-esaj   utz?
   who   CMP-A3-E3-get good
   ‘Who got good grades?’

b. K’o-t   jun.
   exist-NEG one
   ‘No one.’

c. A Raul x-Ø-r-esaj=t   utz?
   CLF Raul CMP-A3-E3-get=NEG good
   ‘Didn’t RAUL get a good grade?’

d#A Raul taj x-Ø-r-esaj   utz?
   CLF Raul NEG CMP-A3-E3-get good
   ‘Didn’t RAUL get a good grade?’

e. Are’.
   he
   ‘No (, he didn’t).’
The data above show that in K’iche’ the distribution of negation in NFPQs is sensitive to the inner versus outer negation interpretations associated with negative polar questions. Thus, the distribution of negation in NFPQs provides another instance of the morphosyntactic reflex of the inner/outer negation ambiguity in negative polar questions.

In the next section, I turn to augmenting the K’iche’ fragment with an analysis of polar questions and answers.

5.4 K’iche’ fragment: polar questions and answers

In this section, I augment the K’iche’ fragment with an analysis of broad and narrow focus polar questions and answers.

5.4.1 Broad focus polar questions and answers

Recall from chapter 3 that when a constituent question like *Who slept?* is asked and accepted in discourse, the context change associated with the question has the effect of pushing on top of the TUD-stack a DR for the maximal plurality of individuals with the property of sleeping. Given that answers are complete, the choice of a maximal plurality with the property in question gives the true complete answer. Since the way answers are defined is the same for all kinds of questions, the Hamblin presumption of a polar question is analogous to the Hamblin presumption of a *who*-question.

To illustrate, consider the polar question in (307) and its (static) Hamblin presumption given in (308). In (308), X is of type \( p^# \), i.e., a propositional plurality, and maximizes is of type \( (p^# \rightarrow p) \rightarrow p^# \rightarrow p \) This is because we obtain an alternative, i.e., a possible complete answer, by a particular choice of a maximal plurality of propositions each of which has the property of being (i) true, and (ii) equal to the proposition in question. So, the Hamblin presumption is the proposition that there exists a (unique) propositional plurality \( X \) such that \( X \) maximizes the property of being true and being equal to rain. Note that there are only two possibilities for being such a plurality. It is either
the plurality whose only atom is the proposition in question, corresponding to the positive answer, or it is the null plurality of propositions, which corresponds to the negative answer.

(307) Is it raining?

(308) \( \exists_{X,p^*} \text{maximizes} (\lambda_{Y,p^*}.(\text{fact}_Y) \text{ and } ((\text{equal rain})_Y)) \ X \)

Given the above analysis of broad focus polar questions, what gets pushed onto the TUD-stack after the acceptance of the question is a plurality of propositions. In order to capture the meaning of broad focus polar questions, I use the operator \( \text{WHETHER} \) defined in (169c) and repeated below as (309) by using the dynamic \( \text{WHICH}_A \) defined in (169a) and instantiating \( A \) as \( p \).

(309) \( \text{WHETHER} =_{\text{def}} \lambda_K.\text{WHICH}_p \text{FACT}_#(\text{EQUALS } K)_# \)

Given the broad focus polar question operator \( \text{WHETHER} \), the content of the question in (307) is given in (310).

(310) \[ \text{WHETHER RAIN} \]
\[ \quad = \text{WHICH}_p \text{FACT}_#(\text{EQUALS RAIN})_# \]
\[ \quad = \lambda_c.\lambda_{x \in [-1]} \langle \text{maximizes} (\lambda_Y.(\text{fact}_Y) \text{ and } ((\text{equal rain})_Y)) \rangle_{x \in [-1]} \]

Based on the analysis of broad focus polar questions and, in particular, their effect on the TUD-stack, the positive answer \textit{jee} ‘yes’ in K’iche’ is modeled by the lexical entry in (311). In this lexical entry, \( \text{nonnull}_p : p^* \rightarrow p \) applies to the propositional plurality on top of the TUD-stack. Thus, the asserted content of a \textit{jee} ‘yes’ answer is that the plurality of propositions on top of the TUD-stack is nonnull. From this, it follows that it is the plurality whose only atom is the proposition in question.

(311) \( \vdash \text{jee} ; F ; \lambda_c.\lambda_{x \in [-]} \langle \text{nonnull}_{p^*} \pi_2(c x), [] \rangle \)

As for a positive answer that takes the form of the repetition of the main predicate in question, it is modeled using the lexical entry given in (313). For example, the repeat answer to the question in (312) is obtained by applying (313) to the lexical entry for the verb \textit{xwarik} ‘s/he slept’ as in (314).
The lexical entry in (313) takes the repeated predicate of the polar question and produces an expression of tectotype F. In the pheno, it feeds the empty string e to the pheno of its argument. In the semantics, the asserted content is the same as that of a jee’ ‘yes’ answer, namely that the DR on top of the TUD-stack is non-null.6

As for a negative answer to a polar question, note that the application of (313) to the repeated main predicate of a question yields an expression of tectotype F. Thus, in order to get a negative answer to the polar question, we use the lexical entry for short answer negation defined in (269) in chapter 4.7

Having illustrated the analysis of positive and negative answers to broad focus polar questions, I turn to a discussion of the analysis of answers to narrow focus polar questions in K’iche’.

5.4.2 Narrow focus polar questions and answers

Recall that answers to narrow focus polar questions in K’iche’ take the form of the repetition or pronominalization of the expression in the focus position or the negation thereof. In addition to such repeat answers, positive answers can also be formed by jee ‘yes’. Recall also that narrow focus polar questions are felicitous in contexts where either the corresponding constituent question

6The complete analysis of repeat answers calls for a richer model of the TUD-stack where we can keep track of both the surface form and the meaning of the question. Such an extension would make it possible to analyze repeat answers to polar questions by modeling the phenogrammar of repeat answers as the pheno of the predicate of the question.

7Given that the lexical entry for jee’ ‘yes’ is also of tectotype F, this analysis generates the ungrammatical *jee’ tat. ‘yes NEG’
is asked or the property under discussion can be inferred from prior context. For example, in (315), the question is asking whether Raul is in the maximal plurality of individuals with the property of sleeping.

(315) A Raul x-∅-war-ik?
   CLF Raul CMP-A3-sleep-SS
   ‘Did RAUL sleep?’

I model narrow focus polar questions such that the anaphoricity to a salient property in prior context is encoded in their meaning. By using WHETHER defined in (309) and the dynamic meaning of long answer FCs defined in (171) and abbreviated below as LAF, I define the narrow focus polar question operator NARROW as in (316). This operator takes the focused expression and its continuation to form the corresponding narrow focus polar question.

(316) NARROW =_def λZ.λD.WHETHER (LAF Z D)

Given the definitions of WHETHER and LAF, the content of the question in (315) is given in (317).

(317) NARROW RAUL SLEEP#

= WHETHER (LAF RAUL SLEEP#)

= λc.λx|x|+1.⟨maximizes (λY.((fact# Y) and

( (equals ((x the (NAMED-RAUL) c) ⊑ nn x the (MAXIMIZES SLEEP# c))# Y)))) x|c|, [x|c|]⟩

Given the above analysis of narrow focus polar questions, their answers are modeled similarly to answers to broad focus polar questions discussed in the previous section. For example, answering a narrow focus polar question with jee ‘yes’ has the same effect it has when it is used to answer a broad focus polar question, namely to assert that the plurality of propositions on top of the TUD-stack is non-null. From this, it follows that in, say, (315), Raul is in the maximal plurality of individuals with the property of sleeping.
As for repeat answers to narrow focus polar questions, they are modeled similarly to repeat answers to broad focus polar questions. For example, the repeat answer *a Raul* ‘Raul’ to (315) is obtained by applying (318) to the lexical entry for the name *Raul* as illustrated in (319).

(318) \( \lambda_q.(q\;\lambda_x.s);\;QP \rightarrow F;\;\lambda_c.\lambda_{\lambda(x)}.\langle\text{nonnull}_{p}\;\pi_2(c\;x),[]\rangle \)

(319) \[ \begin{align*}
\vdash \lambda_q.(q\;\lambda_x.s); & \quad \vdash \lambda_g.(g\;araul); \\
QP \rightarrow F; & \quad QP; \\
\lambda_c.\lambda_{\lambda(x)}.\langle\text{nonnull}_{p}\;\pi_2(c\;x),[]\rangle & \quad \text{RAUL} \\
\vdash araul; \;F; \;\lambda_c.\lambda_{\lambda(x)}.\langle\text{nonnull}_{p}\;\pi_2(c\;x),[]\rangle & \quad \text{RAUL} \\
\end{align*} \]

This concludes the extension of the K’iche’ fragment to include broad and narrow focus polar questions and answers.

### 5.5 Summary and discussion

In this chapter, I showed that that the interpretation of a negative polar question in K’iche’ gives rise to the inner versus outer negation ambiguity. In addition, I showed that this ambiguity has morphosyntactic reflexes both for broad and narrow focus polar questions in K’iche’.

I then provided analyses for broad and narrow focus polar questions. Based on the definition of. Narrow focus polar questions, on the other hand, receive an analysis similar to Krifka’s (2017) analysis for narrow focus polar questions in English.

An important issue that I leave for future research is a more complete analysis of repeat answers. In particular, we need to develop a richer structure of context in DyCG to keep track of the phenogrammar of interrogatives alongside their dynamic meaning. As a starting point, this richer context model would make it possible to analyze repeat answers to polar questions in K’iche’ by modeling the phenogrammar of repeat answers as the pheno of the predicate of the question.

Another important issue that I leave for future research involves a complete formal analysis of the inner/outer negation ambiguity in polar questions, which I will only sketch here. Building on the data and the analysis outlined in §5.2.2, this analysis involves positing a verum focus operator.
along the lines of Höhle 1992 and Romero & Han 2004. In particular, in the analysis of INPQs, verum would take scope over negation and the question operator would take scope over verum. In the analysis of ONPQs, negation would take scope over verum and the question operator would take scope over negation. Consequently, we would capture the scopal relations between verum, negation and the question operators. Note that this scopal analysis would also be in line with the observation that a narrow focus polar question in K‘iche’ has has an outer negation interpretation when negation is in the focal domain (negation takes scope over focus) and an inner negation interpretation when negation is in the post-focal domain (focus takes scope over negation).
Chapter 6

Conclusion

In this chapter, I summarize the main claims and findings of this thesis. I also suggest some areas for future research.

6.1 Summary

One of the main claims I made in this thesis is that answer FCs and *aree* FCs differ in their interpretations. In particular, I argued that *aree* FCs gives rise to existence and exhaustivity implications (the latter when they are used to reply to constituent questions), neither of which necessarily arises from the interpretation of answer FCs. This finding goes against the traditional claim in the literature that focus constructions in Mayan are interpreted like *it*-clefts across the board. By considering contexts in which *aree* FCs and *it*-clefts are not used to reply to questions, I also argued that the interpretation of these constructions do not involve a so-called exhaustivity implication. Rather, in the analysis proposed in this thesis, an exhaustivity implication arises as an epiphenomenon when these constructions are used to reply to questions.

Next, I discussed negation in K’iche’ and showed that in non-focus sentences and in *aree* focus constructions, the clitic =t(aj) ‘NEG’ attaches to the first prosodic word of the predicate of the sentence to be negated. In answer focus constructions, on the other hand, =t(aj) ‘NEG’ has a variable distribution which has not been noted in the previous literature: it attaches to a prosodic word of the expression in the pre-predicate focus position but not necessarily to the first one. I showed that this variability in distribution has no effect on the interpretation of the sentence.
Building on the observations about how negative answers are formed and interpreted in K’iche’, I took up the much-discussed issue of association with focus (e.g., Jackendoff, 1972; Rooth, 1996; Beaver & Clark, 2008; Herburger, 2016) in negative answers and argued that the facts about K’iche’ motivate an alternative analysis which has implications for English. I proposed an analysis of negative answers and negative responses in K’iche’ and in English, without making recourse to association with focus. The analysis also had the interesting implication that English does not have long negative answers.

Finally, I considered broad and narrow focus polar questions and answers in K’iche’. In particular, I showed that negative polar questions in K’iche’ exhibit the inner versus outer negation ambiguity and that this ambiguity has a morphosyntactic reflex. I showed that in broad focus polar questions, the ambiguity is reflected in the use of ink’aj ‘some’ (outer negation) versus nijun ‘any’ (inner negation). In narrow focus polar questions, the ambiguity is reflected in the distribution of t(aj) ‘NEG’: negation occurs in the verbal domain if the question has an inner negation interpretation whereas it occurs in the preverbal domain if the question has an outer negation interpretation. In addition, I showed that narrow focus polar questions with and without aree ‘FOC’ differed in their interpretations as the interpretation of the ones with aree ‘FOC’ gives rise to an existence presupposition.

To capture the anaphoric relation between questions and answers, I extended the DyCG context model (Martin, 2013; Martin & Pollard, 2014) and added what is called a topics under discussion (TUD)-stack, the component of the context keeps track of accepted questions in discourse. Based on the original definition of questions in Hamblin 1957 and Hamblin 1971, I developed a compositional, dynamic, and neo-Hamblinian theory of questions and answers. I then provided an explicit analysis of questions and answers in K’iche’ and their interaction with negation.

I argued that the neo-Hamblinian dynamic analysis I proposed improves on certain existing analyses. For example, I pointed out that the DRs that get introduced by question words are independently needed since they can antecede anaphora. This is additional motivation for keeping track of questions via the DRs they introduce in a dynamic setting. I also pointed out that in the neo-
Hamblinian analysis, there is a closer connection between questions and answers than alternatives-based approaches since analyzing answers as anaphoric to DRs introduced by questions enables access to the continuation of the question word, which a short answer needs to have access to for its interpretation. This, in addition, is another advantage of the TUD-stack over the QUD-stack since in the latter approach, the answer needs to ‘look inside’ the current QUD, which is stored as a set of propositions, and somehow figure out the continuation. Moreover, the current analysis eliminates the need for functional representations in order to have access to continuations of question words, and therefore does not suffer from the problems associated with the categorial approach and related theories, e.g., structured meanings (Aloni et al., 2007; Beaver & Clark, 2008).

6.2 Future work

As I discussed in chapter 3, an important area for future research on K’iche’ involves systematically extending the empirical basis for the analysis of focus constructions to include different kinds of non-interrogative contexts in which focus constructions can be used. With a richer empirical basis and a better understanding of the function of focus constructions across different contexts, we can ask whether we should distinguish between different kinds of focus constructions each with their particular properties or whether a unified analysis can be developed, e.g., by analyzing all instances of focus constructions as answers to implicit or explicit questions. Another possibility that comes to mind is to develop a unified analysis of focus constructions where the common core of focus constructions is anaphora to a property in the linguistic or non-linguistic context (cf. the discussion of Stainton 2005, 2006), but the anaphora resolution is handled by general pragmatic principles that govern notions like saliency and plausibility. In such an analysis, what I called answer FCs in this thesis would not be analyzed as anaphoric to questions per se. Rather, the meaning of focus constructions would be left underspecified and the antecedent property, whether it is due to an accepted question in prior discourse or to some other linguistic or non-linguistic means, would be retrieved by general pragmatic principles.
Another area of future research involves developing a richer structure of context in DyCG to keep track of questions that allows access to their phenogrammar and to their tectogrammar. Such an extension would make it possible to analyze repeat answers to polar questions in K’iche’ by modeling the phenogrammar of repeat answers as the pheno of the predicate of the question. In addition, such a model would potentially make it possible to develop an analysis of the so-called connectivity effects, namely the identity of form between a question word and a short answer, e.g., the case-matching requirements between the morphological case on a short answer and that on the question word, a tecto-level match, observed in languages like Greek, German, Hebrew, Russian, etc. (Merchant, 2004). In general, the form identity between questions and answers calls for a model where we not only keep track of the meaning of accepted questions but also their surface form and their tectogrammar.

As I mentioned in the previous chapter, an important issue that I leave for future research is a complete formal analysis of the inner/outer negation ambiguity in polar questions, which I will only sketch here. A fruitful way to develop an analysis of this ambiguity involves positing a verum focus operator along the lines of Höhle 1992 and Romero & Han 2004. In particular, in the analysis of INPQs, verum would take scope over negation and the question operator would take scope over verum. In the analysis of ONPQs, negation would take scope over verum and the question operator would take scope over negation, thereby capturing the scopal relations between verum, negation and the question operators.

Finally, a further area of research is to extend the DyCG context to capture acceptance and rejection of discourse moves; in particular, acceptance and rejection of assertive and interrogative speech acts. Currently, the cc function applies as if all utterances are accepted by the interlocutors. But a more realistic context model would include a way to handle the intermediary steps before the utterance of a declarative or interrogative sentence has an effect on the CG and/or the TUD-stack. One way to go about enriching the DyCG context to handle acceptance and rejection of discourse moves is to add two additional stacks: one to keep track of the proffered content of assertions, and the other to keep track of the proffered content of interrogative speech acts. For example, when a
declarative sentence is uttered, a function, call it assert would put the proposition it expresses on top of the stack for assertions that are not yet accepted. In the case of the acceptance of assertion, handled by accept-assert, the proposition it asserts would be popped off the relevant stack and added to the CG. Similarly, when a question is asked, a function, call it ask, would put the corresponding DR on top of the stack for questions that are not yet accepted. In the case of the acceptance of the question, handled by accept-ask, the question it proffers (or the corresponding DR) would be popped off the relevant stack, pushed onto the TUD-stack and the Hamblin presumption of the question would be added to the CG indicating the joint commitment of the interlocutors. In the case of rejection, the proposition or the question would be popped off the relevant stack.
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