# PROSODY OF FOCUS AND CONTRASTIVE TOPIC IN K'ICHE'

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## Abstract

This paper discusses the findings of an experimental study about the prosodic encoding of focus and contrastive topic in K'iche'. The central question being addressed is whether prosody plays a role in distinguishing string-identical sentences where the pre-predicate expression can be interpreted as being focused or contrastively topicalized depending on context. I present a production experiment designed to identify whether such sentences differ in their prosodic properties as has been impressionistically suggested in the literature (Larsen 1988; Aissen 1992; Can Pixabaj & England 2011). The overall strategy of the experiment was to obtain naturally occurring data from native speakers of

K'iche' by having them repeat target sentences they heard in conversations. The phonological analysis showed that content words in K'iche' have a rising pitch movement, a finding which is in line with Nielsen (2005). The acoustic analyses of several variables yielded a significant effect of condition only in the range of the F0 rise associated with focused and contrastively topicalized expressions. However, the difference across conditions is only ~6 Hz which may not be perceivable by listeners.

## 1 Introduction

In K'iche', a Mayan language of Guatemala, sentences like (1) may have two different interpretations given appropriate context (throughout, I use **boldface** for that part of the example which is relevant to the discussion at hand)[1]:

(1)    **A**  **Raul** x-∅-war-ik.
       CLF Raul CMP-A3-sleep-SS

    a.  'Raul slept.'
    b.  'As for Raul, he slept.'

(1-a) is obtained when the pre-predicate expression *A Raul* 'Raul' is *focused*, i.e. when it is an answer to the Question Under Discussion (Roberts 1996), as in (1′)[2]:

(1′)    Context: *Who slept?*

    **A**  **Raul**$_F$ x-∅-war-ik.
    CLF Raul   CMP-A3-sleep-SS
    'Raul slept.'

(1-b), however, is obtained when the same expression is interpreted as a *contrastive topic*, the denotation of a topical constituent in a contrastive context (Roberts 2012), as in (1″):

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[1] Unless otherwise stated, all the data in this paper are from original fieldwork in Santa María Tzejá, Ixcán, 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 = [ʃ], and j = [x] or [χ]. The following abbreviations are used in the glosses of the examples: A1(p), A2(p), A3(p) = absolute first, second, third person singular (plural) marker; E1(p), E2(p), E3(p) = ergative first, second, third person singular (plural) marker; 2s(p).f = second person singular (plural) formal; AFF = affectionate; AG = agent focus; AGT = agentive; AP = antipassive; ASP = aspect; CLF = classifier; COM = comitative; CMP = completive; COMP = complementizer; DAT = dative; DEM = demonstrative; DET = determiner; EMPH = emphatic; ENC = enclitic; FOC = focus particle; GEN = genitive; INCMP = incompletive; INSTR = instrumental; INTS = intensifier; IV = terminal suffix for morphologically intransitive verb; MOV = movement; NEG = negative particle; P>I = intransitive derived from positional; PART = particle; PERF = perfect; PL = plural; POS = positional; PREP = preposition; SS = status suffix; TOP = topic marker.

[2] The subscripts $_F$ and $_{CT}$ in K'iche' sentences indicate focused and contrastively topicalized expressions, respectively.

(1″)  Context:  A: *Raul and Roberto didn't work last night. Roberto went out.*
              B: *And Raul, what did he do?*
              A: **A**    **Raul**$_{CT}$ x-$\emptyset$-war-ik.
                    CLF Raul    CMP-A3-sleep-SS
                    'As for Raul, he slept.'

A common property of focus and contrastive topic in K'iche', whose basic word order is predicate-initial, is that focused expressions may and contrastively topicalized expressions must be realized in the pre-predicate position. Additionally, such constituents can co-occur before the predicate as in (2), in which case the focused expression, here *al Maria* 'Maria', follows the contrastively topicalized expression, here *a Raul* 'Raul' (compare (2-a) and (2-b)). This fact provides language internal evidence that these discourse functions are distinguished by speakers.

(2)  Context: *I know that Roberto saw Juana yesterday, but who did Raul see?*

    a.    A    Raul$_{CT}$ al    Maria$_F$ x-$\emptyset$-r-il-o.
            CLF Raul    CLF Maria    CMP-A3-E3-see-SS
            'As for Raul, he saw Maria.'
    b.  #Al    Maria$_F$ a    Raul$_{CT}$ x-$\emptyset$-r-il-o.
            CLF Maria    CLF Raul    CMP-A3-E3-see-SS
            (intended reading) 'As for Raul, he saw Maria.'

Alongside the change in basic word order, certain types of focus in K'iche' can be expressed by other morpho-syntactic means but these are neither obligatory nor do they apply across-the-board (more on this below). Consequently, this raises the question as to whether string-identical sentences like (1′) and (1″) differ in their prosodic properties because of the difference in their meaning. A broader question of interest is whether there always is a relation between pragmatics and prosody, in other words, whether meaning differences like the ones above are always reflected in the prosodic structure of otherwise identical sentences. Indeed, as regards K'iche', previous studies claimed that sentences like (1′) and (1″) differ in their prosodic properties. In particular, the literature has discussed whether the pre-predicate expressions in such sentences are set off from the rest of the sentence by a pause or not. Thomas Larsen (1991, p.c. cited in Aissen 1992) suggested that topics[3] in K'iche' are not followed by a pause. On the other hand, Can Pixabaj & England (2011) claimed that topics in K'iche', whether contrastive or not, are followed by a pause whereas foci are not.

In this paper, I discuss findings from a production experiment designed to identify whether the difference in meaning between focus and contrastive topic corresponds to a difference in prosody, which would distinguish string-identical sentences like (1′) and (1″) in K'iche'. The overall strategy of the experiment was to obtain naturally occurring data from native speakers of K'iche' by having them repeat target sentences they heard in conversa-

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[3]There is no indication as to whether Larsen distinguished more than one kind of topic in K'iche'.

tions. The experiment was designed so that in each conversation, only one interpretation of the target sentence would be felicitous.

The rest of the paper is organized as follows. In section 2, I give the relevant background on K'iche' morpho-syntax which is necessary to understand the details of how focus and contrastive topic are expressed. In section 3, I summarize the literature on focus and contrastive topic in K'iche' in detail. I also elaborate on the differences between the current study and the previous work by making explicit my assumptions about focus and contrastive topic. After motivating the research question, I provide an overview of the previous work on the prosody of focus and contrastive topic in several languages including K'iche'. Section 4 presents the details of the production experiment, the analyses and the results before I conclude in section 5.

## 2   Background on K'iche' morpho-syntax

K'iche' is a Mayan language spoken by over a million people in the central and western highlands of Guatemala (Richards 2003). It 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; Pye & Poz 1988; England 1991), where S stands for the single argument of an intransitive, A for the more agent-like argument of a transitive, and O for the more patient-like argument of a transitive verb (Dixon 1994). In (3) and (4), I start with two examples that illustrate intransitive clauses.

(3)     x-∅-war           ri    achi.
        CMP-A3-sleep  DET  man
        'The man slept.'

(4)     x-at-war-ik.
        CMP-A2-sleep-SS
        'You slept.'

In K'iche', there is no case-marking on noun phrases, e.g. *ri achi* 'the man' in (3), to identify grammatical relations or semantic roles; these are read off of the verbal complexes via the ergative and absolutive cross-reference markers given in Table 1.

The absolutive markers are used to cross-reference, i.e. register the number and person features of, the S argument of an intransitive verb and the O argument of a transitive verb. In an intransitive verbal complex, e.g. *x-∅-war* 'CMP-A3-sleep' in (3), the sole argument *ri achi* 'the man' is cross-referenced 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'. In (4), where the argument of the verb is not real-

| Ergative | Preconsonantal | Prevocalic | | Absolutive | |
|----------|----------------|------------|---|------------|---|
| E1 | *-in-* | *-inw-/-w-* | | A1 | *-in-* |
| E2 | *-aa-/-a-* | *-aw-* | | A2 | *-at-* |
| E3 | *-uu-/-u-* | *-r-* | | A3 | *-∅-* |
| E1p | *-qa-* | *-q-* | | A1p | *-uj-/-oj-* |
| E2p | *-ii-* | *-iw-* | | A2p | *-ix-* |
| E3p | *-ki-* | *-k-* | | A3p | *-e'-/-eb'-/-ee-* |

**Table 1: Ergative and absolutive agreement markers**

ized, the verbal complex also carries the status suffix *-(i)k* 'SS' following the verb root. This marker is claimed to mark phrase-finality, in particular, the end of an intonational phrase Henderson (2012) and it is used for intransitive verbs in the incompletive and completive aspects.

The other set of markers in Table 1, namely the ergative markers, are used to cross-reference the A argument of a transitive verb as exemplified in (5):

(5)    x-at-u-to'-o.
       CMP-A2-E3-help-SS
       'S/he helped you.'

In a transitive verbal complex, e.g. *x-at-u-to'-o* 'CMP-A2-E3-help-SS' in (5), the absolutive marker *-at-* 'A2', which marks the O argument of the verb, precedes the ergative marker *-u-* 'E3', which marks the A argument. The ergative marker, in turn, precedes the verb root *to'* 'help'. Similar to intransitive verbs, transitive verbs may carry phrase-final suffixes when they occur at the end of intonational phrases (Henderson 2012). For example, in (5) the verb root is followed by the status suffix *-o*[4].

Since K'iche' does not use overt marking on noun phrases, it is the absolutive marker *-∅-* 'A3' that identifies, say, *ri achi* 'the man' as the O argument in (6) and it is the ergative marker *-u-* 'E3' that identifies *ri achi* in (7) as the A argument (Trechsel 1993):

(6)    x-∅-a-to'          ri    achi.
       CMP-A3-E2-help DET man
       'You helped the man.'

(7)    x-at-u-to'         ri    achi.
       CMP-A2-E3-help DET man
       'The man helped you.'

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[4]The 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).

Although the basic word order in K'iche' is VS/VOA, in texts it is relatively uncommon to find the A, O or the S arguments in post-predicate positions realized as pronominal arguments. Larsen (1987:40) claims that independent pronouns, which rarely appear in argument positions, are used in some cases to indicate "contrastive emphasis" or change of subject[5]. These pronouns, given in Table 2 below, are identical to absolutive markers except for the third person singular and plural.

| 1sg | *in* |
| 2sg | *at* |
| 3sg | *are'* |
| 1pl | *oj* |
| 2pl | *ix* |
| 3pl | *e a're'/a're'/ke* |

**Table 2: Pronouns in K'iche'**

In addition to these pronouns, K'iche' marks formality/politeness for second person by two morphemes[6]: (i) *la* 'you' (singular) and (ii) *alaq* 'you' (plural) which occur postverbally (Trechsel 1993). In (8), *la* '2s.f' marks the formal second person singular ergative argument and *oj* 'A3' marks the absolutive argument. In (9), *alaq* '2p.f' marks the formal second person plural argument:

(8)    x-oj-to'      **la**.
       CMP-A3-help 2s.f
       'You (sg. formal) helped us.'

(9)    x-pee      **alaq**.
       CMP-come 2p.f
       'You (pl. formal) went.'

The two word orders I discussed in this section characterize basic, non-emphatic sentences, i.e. sentences which do not involve topicalization or focus, and in which pronominal arguments are usually dropped. After this basic description of the relevant morphosyntactic properties of K'iche', I now turn to the main topic of the paper, namely how the two discourse functions focus and contrastive topic are expressed.

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[5]In the discussion of focus and topic below, we will see that these pronouns can occupy the pre-predicate positions when they are focused or topicalized.

[6]The formal pronouns will become relevant later on in the discussion of agent focus marking.

## 3 Focus and contrastive topic in K'iche'

### 3.1 Previous literature on focus in K'iche'

A general claim about Mayan languages, dating back to Norman (1977), is that they are generally predicate-initial, but that there are also two special positions preceding the predicate that constituents can occupy for pragmatic purposes. The discourse functions that these constituents have, which are called *focus* and *topic*, govern the changes in the basic word order in K'iche' (Larsen 1988; England 1991). Norman (1977) claimed that focus and topic are structurally different in that focus occupies the pre-predicate position whereas topic occurs sentence initially.

Focus constructions in Mayan have been traditionally analyzed as involving a movement operation whereby the focused constituent is realized in the pre-predicate position and linked to a gap in the post-focal portion of the sentence (Larsen 1988; Aissen 1992; Trechsel 1993)[7]. In her seminal work on topic and focus in Mayan, Aissen (1992) claimed that focused constituents occupy the [Spec, I′] position and bind a co-indexed trace lower in the tree. The constituents occupying the focus position are generally understood to be semantically "prominent" in some sense (Larsen 1988) as reflected in the cleft translation into English in (10), which is the standard practice in the Mayan literature (Aissen 1992; Larsen 1988; Trechsel 1993; Can Pixabaj & England 2011):

(10)   **Aree ri   achi** x-∅-q'ab'ar-ik.
       FOC  DET man CMP-A3-get.drunk-SS
       'It was the man who got drunk.'                          (Larsen 1988:503)

Aissen (1992:43), in particular, claims that focus in Mayan has the two characteristics associated with the interpretation of clefts: an existence presupposition and a uniqueness assertion. The following example from Aissen (1992:49) is taken from the middle of a text in Tzotzil, where one individual, walking along, meets another working in a field who utters (11-a) and the narrative continues with (11-b). According to Aissen, in (11-b) 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:

(11)   a.   'I'm planting. I'm planting stones, I'm planting trees',
       b.   Pero **chobtik** tztz'un   un.
            but   corn       he.plants ENC
            'But it was corn he was planting.'                  (Aissen 1992:49)

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[7]In fact, Mayanists have traditionally subsumed pre-predicate focus constructions, content questions and relative clauses under the heading of focus because they characterized these constructions by the obligatory presence of a constituent preceding the predicate, the obligatory gap in the post-focal portion of the sentence, a dependency between them and the use of agent focus form (Larsen 1988; Trechsel 1993).

Focus constructions in Mayan are further characterized by a special verb form called the *agent focus* form, a much discussed phenomenon in the context of focus (see e.g. Mondloch 1981; Larsen 1988; Trechsel 1993; Aissen 2011 for K'iche' and Dayley 1981; Aissen 1999; Stiebels 2006 for other Mayan languages). Agent focus can only be used with transitive verbs when the ergative argument of the verb is focused as in (12):

(12)    Aree le    achi x-∅-kuna-**n**     le    ixoq.
        FOC  DET man CMP-A3-cure-AG DET woman
        'It was the man who cured the woman.'                    (Trechsel 1993:42)

The verbal complex in (12), *x-∅-kuna-n* 'CMP-A3-cure-AG', is in the agent focus form which is expressed by (i) the absence of an ergative marker *-u-* 'E3' on the verb, and (ii) the presence of the agent focus marker[8] *-n* 'AG' attached to the verb. In (12), both the agent and the patient are third person singular and it is indeterminate whether it is the agent or the patient that the absolutive marker agrees with. Yet, when there is an agent focus marker, the interpretation is always that the pre-predicate argument, which denotes the agent of the action, is focused. Larsen (1988) points out that the agent focus form can never be used in simple transitive clauses.

In a recent study on K'iche' texts, Can Pixabaj & England (2011) argue that there are two types of focus in K'iche'. The first type is what they call *contrastive focus* which "usually requires an explicit contrast" and which, they claim, operates like clefts in English (p.23). In (13), for instance, Can Pixabaj & England (2011:22) say that the focused expression "explicitly contrasts 'my parents' with 'me', identified negatively in the previous clause ('it wasn't I who saw')":

(13)    Pero **aree r-in-taat**     k-e-tzjo-**n**-ik.
        but   FOC DET-E1-father INCMP-A3p-recount-AG-SS
        '...but it was my parents who recounted (it).'    (Can Pixabaj & England 2011:22)

According to Can Pixabaj & England, this kind of focus requires the use of the focus particle *aree* 'FOC' with definite nominals[9] as well as the agent focus form of the verb when ergative arguments are focused as in (13). They also claim that this type of focus is not followed by a pause (p.21)[10].

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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]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"". They also claim that *xow* 'only' can precede definite nominals in contrastive focus contexts but they do not provide examples.

[10]The source of the examples in this study is based on five texts with more than 1,800 clauses. The commas in the texts after expressions in the pre-predicate position are taken to indicate pauses, and the lack thereof as evidence that there are no pauses.

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. Yet, similar to the first type focus, focused expressions of this type are not followed by a pause (p.23). 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):

(14)　Chanim, **le　don Santiago** k-∅-u-tzijoj　　cha-q-e　　　jas　le
　　　　now　　DET don Santiago INCMP-A3-E3-tell PREP-E1p-DAT what DET
　　　　u'istoria　r-ech　we　jun tinamit Santa Lu's.
　　　　E3-history E3-POS 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):

(15)　es　ke　**ri　achi**, ri　r-ajaw　　w-u'lew rii',　∅-k'o　jun u-tajkil
　　　　it.is that DET man　DET E3-master DET-land DEM A3-exist one E3-errand
　　　　aw-uuk'
　　　　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)

Can Pixabaj & England do not explicitly provide the contexts in which these sentences are uttered. So, for instance, in (15) we do not know what the immediately previous context is and, therefore, we do not know whether *ri achi* 'the man' is focused or topicalized. Similarly, in (14), we do not know why *don Santiago* is necessarily identified as the person who will speak. This sentence may very well be an all focus sentence answering an implicit question like *What is going to happen now?* 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 claims.

To summarize, we have seen that focus in K'iche', just as in other Mayan languages, can occur before the predicate. According to Aissen (1992), Larsen (1988) and Trechsel (1993) focus sentences are interpreted like clefts in English. According to Can Pixabaj & England (2011), however, K'iche' focus divides into two and only those sentences where the focused expression is preceded by *aree* 'FOC' are interpreted like clefts. Can Pixabaj

& England further claim that foci in K'iche', regardless of their type, are not followed by a pause. In the following section, I will elaborate on the assumptions I am making about focus and in doing so show how they can be applied to K'iche'. These assumptions are necessary to elaborate on my research question.

## 3.2 Background assumptions about focus

At an intuitive level, focus involves a way to mark "highlighted" or "emphasized" information in discourse. This seems to have been the general approach in the Mayan community in terms of its characterization of what is meant by the term focus. Despite ample discussion of this phenomenon in the literature along similar lines, the present study makes different assumptions about focus and how focus is expressed in K'iche'. Part of the reason for this departure from the common assumptions is empirical in that the generalizations made in the literature do not hold up against the data that I collected, which I illustrate below. Yet, the main motivation for a different characterization of focus in K'iche' is to situate it in the broader semantic-pragmatic literature and to have a principled characterization of focus that makes predictions. It might turn out that these assumptions need to be revised but the advantage of the framework that I will summarize below is that it gives us working definitions that we can test. It is not always clear what is meant by "new information", "emphasis" or "reintroducing a participant" etc. and without explicit definitions of these discourse functions, it is hard to come up with adequate analysis of the pragmatic phenomena that are under discussion.

A more principled characterization of focus is to consider it as answering an explicit or implicit question (Jackendoff 1972; Roberts 1996), which Kadmon (2001) claims to be the most basic and crucial intuition about focus. From this point of view, in a constituent question-answer pair, the phrase corresponding to the question-word is focused. So, for instance, in English the sentence *Michael ate tortillas*, with prosodic prominence on *Michael*, in particular a H* accent followed by a L-L% boundary tone[11] (Jackendoff 1972; Büring 2003) can constitute a felicitous answer to *Who ate tortillas?* (16) but not to, say, *What did Michael eat?* (17):

(16)    Context: *Who ate tortillas?*
        MICHAEL        ate tortillas.
           H*                              L-L%

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[11]The letters L and H are used in the Autosegmental-Metrical (AM) Framework (Pierrehumbert 1980), which is a framework for intonational analysis. In the AM theory, the prosodic grouping and prominence relations are represented by distinctive pitch events, transcribed by a sequence of Low (L) and High (H) tones. or combinations thereof. The tones are marked with diacritics indicating their intonational function. There are *pitch accents* that mark prominence and *boundary tones* that mark the edges of prosodic boundaries. A star (*) on a pitch-accent indicates that it is associated with a stressed syllable. The % sign on a tone indicates a prosodic boundary.

(17)    Context: *What did Michael eat?*
        #MICHAEL        ate tortillas.
          H*                          L-L%

In (16), where the Question Under Discussion (QUD) is *Who ate tortillas?*, *Michael* corresponds to *who* whereas the rest of the sentence, *ate tortillas*, is congruent to the QUD in the sense that abstracting on the *wh*-word in the question yields the property $\lambda_x.x$ ate tortillas which is also the denotation of the rest of the sentence. Sometimes this partitioning with respect to a QUD is termed as the *Theme/Rheme* distinction where *Rheme* denotes the focus and *Theme* denotes the part of the sentence congruent to the QUD (Roberts 2012). A QUD is a semantic question, i.e. a set of propositions, that corresponds to the current discourse topic (Roberts 1996:93). It may be the denotation of an actual question that is asked as in (16) above or may be implicit in the discourse (Roberts 1998). As the examples above illustrate, focus presupposes that there is such a QUD, a presupposition which, together with contextual clues, enables the addressee to reconstruct, or *retrieve*, the QUD (Roberts 1996).

A related and widely-held view about focus is that it evokes alternatives in discourse (Rooth 1992). According to Rooth's analysis of focus interpretation, prosodic prominence on *Michael* in (16) evokes alternatives such as *Robert*, *Jane*, *Peter*, etc. with which one constructs a set of propositions of the form, $x$ ate tortillas, for the original sentence where $x$ ranges over possible alternatives drawn from a contextually restricted set $E$. This set of alternatives that focus evokes helps determine an additional semantic value for an utterance, which Rooth calls *the focus semantic value*. In other words, the focus semantic value of a focused expression $\alpha$, denoted by $[\![\alpha]\!]^f$, is obtained by making a substitution in the position corresponding to the focused expression in the sentence. To illustrate, the focus semantic value of (16) is given in (18). The ordinary semantic value can be drawn from the focus semantic value as the former is always an element of the latter (Rooth 1992:76). Crucially, the focus semantic value of (16) is the same set we obtain by abstracting on the *wh*-word in the question in (16), hence the question-answer congruence (Roberts 1996).

(18)    $[\![[\text{MICHAEL ate tortillas}]]\!]^f = \{\mathbf{ate}(x, \mathbf{tortillas}) | x \in E\}$

So far, I have illustrated the question-answer congruence with English examples where focus is marked prosodically. Yet, Roberts (1996) points out that the prosodic realization of focus is not universally assumed by those working on the semantics of focus. This means that focus may involve non-prosodic means and, in fact, many languages use cleft-like structures, marked word order or special morphemes to indicate focus in addition to intonational marking (Büring 2011). Therefore, the common core of focus is the observation that it evokes alternatives and that it is intuitively linked to question-answer congruence irrespective of the actual means of realizing focus (Roberts 1996; Rooth 1996).

In the present study, I follow the line of thinking summarized above and characterize

focus in K'iche' as follows: (i) a focused expression can occur before the predicate and (ii) its meaning will yield an answer to the QUD when the meaning that is congruent to the QUD applies to it. In other words, an answer to the QUD, say in (16), is obtained by applying the property $\lambda_x.\ x$ ate tortillas to the meaning of the focused expression. The question-answer congruence, the defining characteristic of focus, can be shown in K'iche' as follows. Consider the examples in (19) and (20): (19-a)/(20-b) is a felicitous answer in (19) but not in (20), and (20-a)/(19-b) is a felicitous answer in (20) but not in (19):

(19)    Context: *Who helped you?*

      a.   **A   Raul**$_F$ x-in-u-to'-o.
          CLF Raul   CMP-A1-E3-help-SS
          'Raul helped me.'

      b.  **#In**$_F$ x-in-u-to'-o.
          I    CMP-A1-E3-help-SS
          'He helped me.'

(20)    Context: *Who did Raul help?*

      a.   **In**$_F$ x-in-u-to'-o.
          I    CMP-A1-E3-help-SS
          'He helped me.'

      b.  **#A   Raul**$_F$ x-in-u-to'-o.
          CLF Raul   CMP-A1-E3-help-SS
          'Raul helped me.'

I will end this section by discussing two properties of the focus stimuli that I used in the experiment. Recall that the research question of the present study builds on the observation that focus and contrastive topic sentences can be string-identical. In order for this to hold, the focus sentences should not carry any special focus marking except for the change in word order because contrastive topics, as we will see below, occur before the predicate with no additional morpho-syntactic marking. Consequently, none of the focus stimuli had the focus particle *aree* 'FOC' in them and, furthermore, when ergative arguments were focused, the agent focus marker wasn't used.

Although it is widely discussed as a concomitant of focusing ergative arguments, the agent focus marker was not obligatory for my informants and they were not making use of this form very often in elicitation sessions. Larsen (1988:505) also reports that using agent focus is optional even when its use is permissible. In any case, there are restrictions regarding the use of agent focus. For instance, at least one of the arguments of the verb has to be third person or second person formal for the use of agent focus to be felicitous:

(21)    ***In** x-at-ch'ay-**ow**-ik.
      I   CMP-A2-hit-AG-SS
      (intended reading) 'I hit you.'

In order to focus the agent NP in (21) one can: (i) use the active voice as in (22), or (ii) demote the patient NP and use the oblique phrase *aw-e* 'E2-GEN' as in (23):

(22)     **In** x-at-in-ch'ay-o.
         I    CMP-A2-E1-hit-SS
         'I hit you.'

(23)     **In** x-in-ch'ay-**ow**   **aw-e**.
         I    CMP-A2-hit-AG E2-GEN
         'I hit you.'

In summary, the agent focus form cannot always be used. Even when it is applicable, there are either restrictions on its use or it alternates with the active form of the verb. Moreover, there is no counterpart of agent focus for intransitive verbs or for cases where the O-argument of a transitive verb is focused. When these arguments are focused, the active form of the verb is used (Larsen 1988; Trechsel 1993). This shows that in general foci can be marked by only a change in word order just as topics. In the next section, I turn to the discussion of topics in K'iche'.

### 3.3   Previous literature on topics in K'iche'

The second discourse function that can be expressed by a pre-predicate expression in K'iche' (and in Mayan languages in general) is called *topic*. The topic of a sentence is defined to be the constituent that indicates what the sentence is about (Aissen 1992; Roberts 2012) and in this sense a topicalized expression is an entity to which our attention is drawn (Aissen 1992; Roberts 2012). Below is an example in K'iche' where the topicalized expression *Ri ulew* 'the earth' precedes the predicate:

(24)     Context: *Tell me something about the earth.*
         **Ri   ulew** k-∅-b'in       chi-r-ij        ri   q'iij.
         DET earth INCMP-∅-walk PREP-E3-around DET sun
         'The earth revolves around the sun.'

Aissen (1992) distinguishes between two kinds of topics in Mayan languages: (i) *external topics* and (ii) *internal topics* and argues that these topics behave differently both structurally and pragmatically. The following example from Tzotzil illustrates external topics. Aissen points out that the first line in (25) introduces two discourse participants, the second line turns attention to one of them, namely *a ti vinik-e* 'the husband' and asserts something about him, and the third does the same for the other participant, here *a ti antz-e* 'the wife'. Both of the topicalized expressions are preceded by the topic marker *a* 'TOP'. They are also usually accompanied by a definite determiner *ti* 'DET' and an enclitic *e* 'ENC'.

(25)    a.    There was a man and a woman, newlyweds.

        b.    **a  ti  vinik-e**   ta-xlok' ech'el, ta-tbat ta-xxanav.
              TOP DET man-ENC exists    away  goes   travels

             'The husband leaves, he goes, he travels.'

        c.    **a  ti  antz-e**     jun-yo'on ta-xkom
              TOP DET woman-ENC happily    stays

             'The wife stays at home happily...'          (Aissen 1992:49)

Aissen refers to external topics as new or shifted topics: once a participant is topicalized in this way, it is not referred to again by an overt nominal unless the topic shifts to another participant (p.51). Structurally, external topics occupy a position outside the clause, as a sister of the CP, and are base-generated. There is no requirement that they bind a coreferential pronoun lower in the clause[12]. Their structure, therefore, resembles that of left-dislocation (p.48) where the topic is prefixed to a fully well-formed root CP so long as the CP is about the topic. Aissen also makes a claim about the prosody of such topics and says they are followed by a pause, which, in her theory, follows from the syntactic structure (p.76).

The second kind of topic Aissen identifies, namely internal topics, involves discourse participants which are already identified as topic and can occur in the pre-predicate position. The following piece of discourse in Tz'utujil provides an example of such topics. The texts starts '[a] long time ago there was a man whose daughter was in a dance' and Aissen claims that (26-a) introduces *rme'al* 'his.daughter' as a new topic, marked by the particle *ka'(ar)* 'PART', and this same topic is referred to again by an overt nominal in the following sentence in (26-b):

(26)    a.    **Ja k'a rme'al**    x-u-koj     pa xajoj  xin Tukun.
              the PART his.daughter ASP-E3-enter in dance of  Tecun

             'He entered his daughter in the dance of Tecun.'

        b.    y **ja rme'al**    x-ok-i     Malincha.
              and the his.daughter ASP-play-IV Malincha

             'and the daughter played the part of the Malincha.'    (Aissen 1992:74-75)

Such NPs can occur in the topic position although their referent has already been established. Structurally, these topics occupy the [Spec, C′] position, and like foci, bind a co-indexed trace lower in the clause. Furthermore, these topics are not separated from the following clause by a pause. As regards K'iche', Thomas Larsen (p.c. 1991, as cited in Aissen 1992) suggested that topics in K'iche' have the function of external topics in terms of their meaning but are associated with the syntax of internal topics, i.e. there is no pause after them.

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[12]In Jakaltek, such topics may bind overt pronouns in the CP and yet in Tzotzil we don't find these pronouns as the language is pro-drop (Aissen 1992:69).

Building on Aissen's work, Can Pixabaj & England (2011) argue that there are two types of topics in K'iche'. Their characterization of topics is structural in that they are interested in "defining structurally the preverbal positions that can be filled by noun phrases". According to their characterization, the first type of topic occurs in "the first position" (sentence-initial; MY) preceding the verb and has no "special" marker such as *aree* 'FOC' or "special" verb form (agent focus form; MY) when it is the subject of a transitive verb (p.19). An example is (27) where Can Pixabaj & England claim that the hunter "was introduced in the previous clause and is here established as the local topic and continues as such for three more clauses, with only anaphoric reference" (p.20):

(27)  **Ri  k'aq-an-eel**, iii b'yeen ∅-u-b'an-om   k'ax ch-k-e
      DET hunt-AP-AGT eh INTS  A3-E3-do-PERF bad  PREP-A3p-DAT
      s-taq-a'waj-iib'.
      AFF-PL-animal-PL
      'The hunter had done much damage to the animals.'
      (Can Pixabaj & England 2011:20)

As with the examples of the different kinds of focus above, Can Pixabaj & England do not provide the context in which this sentence is uttered. Therefore, we do not know how the expression *ri k'aqaneel* 'the hunter' was introduced and whether it occurred in the pre- or the post-predicate position nor do we know whether it was focused or topicalized in the previous clause.

The second type of topic that Can Pixabaj & England (2011) identify is called *contrastive topic* which combines the functions of topic and focus "in the context of changing the topic and at the same time contrasting it with the previous topic" (p.24). According to Can Pixabaj & England, such topics can be preceded by the phrase *aree k'u*[13]. Unlike "contrastive focus", however, there is no "special" verb form (agent focus form; MY) that can be used with this construction. Furthermore, the nominal which is contrastively topicalized is followed by a pause. An example that Can Pixabaj & England (2011) provide is (28) where they say that in clauses before this example "the topic was the hunter, now it is the master of the mountain where he went to hunt" (p.24):

(28)  Tonse are  k'u  **ri  r-ajaw-al**     u-winaq-il    ri'  ri  jyub',
      well   EMPH PART DET E3-master-ABST E3-person-ABST DEM DET ill
      jawi  r-qas    -k-∅-e'-k'aqa-n-a        wi,  x-∅-tak'-i'
      where DET-always INCMP-A3-MOV-hunt-AG-SS EMPH CMP-A3-standing-P>I
      r-oyowaal.
      E3-anger
      'Well, on the other hand the master of the hill, where he always went to hunt, got mad.'                                   (Can Pixabaj & England 2011:25)

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[13]A similar claim made by López Ixcoy (1997) is that the particle *aree* 'FOC' itself precedes contrastively topicalized expressions.

Given that Can Pixabaj & England take topics to occur only before the predicate, it is safe to assume that *the hunter* occurs before the predicate in the clause preceding (28). Yet, we do not know why *the hunter* was the topic rather than the focus because Can Pixabaj & England do not provide the context in which the sentence is uttered. This lack of contextual evidence makes it hard to determine the discourse status of the pre-predicate expressions in the examples they present.

To summarize, we have seen that in Mayan topicalized expressions occur before the predicate and generally two kinds of topic are distinguished. Aissen's external topics and Can Pixabaj & England's contrastive and non-contrastive topics are all separated from the post-topical portion of the sentence by a pause. In the next section, I summarize the assumptions I am making about topics in K'iche' and point out the differences between the previous literature and the present study.

### 3.4   Background assumptions about topics

In this section, I will present the assumptions I am making about topics in K'iche' and the kinds of topical constituents that are realized before the predicate. The first kind of topic, which can be realized in the pre-predicate position, indicates what the sentence is about (29):

(29)     Context: *What happened to Raul?*
         **A   Raul** x-∅-tzaq-ik.
         CLF Raul  CMP-A3-fall-SS
         'Raul fell.'

The other kind of topical constituent, which, as far as my data suggest, is always realized in the pre-predicate position, behaves as a contrastive topic, i.e. the denotation of a topical constituent in a contrastive context (Roberts 2012). A contrastive topic, along-side being a topic, also implies that there is another question about a different topic. Put differently, it implies that there are other entities having the same type as the contrastively topicalized expression and that we are going through a list, so to speak, and answering the QUD with respect to the entity at hand. Consider the example below where, when the topic changes from *Raul* to *Roberto*, the new sentence answers the question with respect to *Roberto*:

(30)     Context: A: *Raul and Roberto are farmers. Last year, Raul sowed corn.*
                  B: *And Roberto, what did he sow?*
                  A: **A    Roberto**$_{CT}$ x-∅-u-tik        kinaq'.
                     CLF Roberto      CMP-A3-E3-sow beans
                     'As for Roberto, he sowed beans.'

Contrary to what Can Pixabaj & England (2011) and López Ixcoy (1997) claim, my consultants did not accept neither the marker *aree k'u* nor the marker *aree* with contrastively topicalized expressions. However, these markers were acceptable for them when the pre-predicate expression was focused. Consequently, contrastively topicalized expressions in my data do not carry the markers *aree* or *aree k'u* and, therefore, can be string-identical to focus sentences without *aree* and without agent focus marking.

## 3.5 Previous studies on the prosody of focus and contrastive topic

So far, I have shown how focus and contrastive topic are expressed in K'iche' and how a sentence with a pre-predicate focus can be string-identical to a sentence with a contrastive topic. I have also noted that the literature on K'iche' has discussed whether the focused or contrastively topicalized expression is set off from the rest of the sentence by a pause. There have been two opposite claims with respect to this issue: (i) Thomas Larsen (1991, p.c. cited in Aissen 1992) claims that K'iche' topics function as external topics in the sense of Aissen (1992) but are not followed by a pause, and (ii) Can Pixabaj & England (2011) claim that topics in K'iche' are followed by a pause regardless of their type whereas foci are not followed by a pause regardless of their type.

Whether there is a pause or not following pre-predicate expressions is one potential prosodic cue that is of interest to the present study. On the other hand, work on other languages has suggested that there are other prosodic cues associated with focus and contrastive topic which need to be taken into account in a thorough study of the prosody of focus and contrastive topic. In the following sections, I briefly summarize the cross-linguistic findings about the prosodic encoding of focus and contrastive topic. I first start with a summary of the work in languages other than K'iche' and then turn to the details about K'iche'.

### 3.5.1 Previous studies on other languages

It has been shown that prosodic prominence on a focused expression can be indicated by various phonological and phonetic means. In English, for example, it has been claimed that focus is primarily marked by a pitch accent, in particular by a H* pitch accent followed by a L-L% boundary tone (Jackendoff 1972; Büring 2003). In fact, it is argued that this intonational contour distinguishes focus from contrastive topic in English as the latter is marked by a L+H* pitch accent followed by a L-H% boundary tone (*ibid.*)[14]. In general, accenting has been taken as the primary source of prosodic prominence marking, at least for English (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

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[14]The accents marking focus and contrastive topic have also been called A and B accent, respectively (Jackendoff 1972), and fall and fall-rise accent, respectively (Büring 2003).

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. Yet, 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. These various phonological properties show that, cross-linguistically, different means are available to indicate prosodic prominence, e.g. accenting, phrasing.

Alongside these phonological means, many languages indicate prosodic prominence through phonetic means. For example, focused expressions in English are typically longer in duration (Cooper *et al.* 1985) and have an expanded pitch range compared to non-focused expressions (Eady *et al.* 1986). Similarly, in Mandarin, focused expressions have an increased pitch range and the pitch range of the post-focal expressions is compressed (Wang & Yu 2011). Another phonetic cue to prosodic prominence involves the alignment of the pitch accent peak. In Spanish, the alignment is earlier (Face 2001) whereas in German it is later on a focused expression (Braun 2006) compared to a non-focused expression.

As regards the prosody of contrastive topic, research has shown that such expressions have a particular prosodic structure, too. I have already noted above that contrastive topics in English are marked by a L+H* pitch accent followed by a L-H% boundary tone. In German, contrastively topicalized expressions carry a late-rising pitch accent and are prosodically separated from the main clause by a prosodic boundary (Féry 2006). In Mandarin, topics raise the initial pitch range but there is no prosodic correlate of contrastiveness of topics (Wang & Yu 2011).

In sum, prosodic effects of focus and contrastive topic can be indicated through both categorical phonological means and continuous phonetic means. An adequate study of the prosodic reflexes of discourse functions like focus and contrastive topic should take such means into account in the analysis.

### 3.5.2   Previous studies on K'iche'

Although the phonology of K'iche' is well-described (Mondloch 1978; López Ixcoy 1997; Larsen 1988), there are not many studies dedicated to its prosodic structure. Nevertheless, there have been some claims about the prosody of focus that I will present in this section.

A study devoted to a preliminary prosodic description of K'iche' is Nielsen (2005). Nielsen's work is different from all of the other work on K'iche' that makes claims about prosodic structure in that it involves intonational analyses of utterances from a native speaker rather than impressionistic claims or text analysis. In her study, Nielsen found that K'iche' has stress driven pitch accent and L+H* is the default pitch accent on content words. This finding is in line with the previous literature which claimed that K'iche' has word-final stress (Larsen 1988). Nielsen also described K'iche' as an accentual phrase

language where prosodic domains which may be slightly larger than a word, namely *accentual phrases*, are marked by a tone. According to Nielsen, the default L+H* accent on the prominent syllable of a content word also marks the boundary of an accentual phrase. Alongside these findings about the general prosodic structure of K'iche', Nielsen found up-stepped pitch accents associated with focused expressions where the L tone of the L+H* associated with the focused expression starts higher than the previous L.

The other claims about the prosody of focus are related to the interaction between focus and negation. It has been traditionally claimed that negation in K'iche' is indicated by the negative particle *man*[15] before the predicate and the so-called irrealis particle *ta(j)*[16] after the predicate, with the form of *ta(j)* changing depending on where it occurs (Larsen 1988; López Ixcoy 1997; Can Pixabaj 2010; Henderson 2012). Henderson (2012) claims that the distribution of *taj* is the same as the status suffixes *-(i)k* and *-o*, i.e. it occurs at the end of intonational phrases[17]. Examples (31-b) and (32-b) below, which are the negated versions of (31-a) and (32-a), respectively, illustrate this variable pattern. In (31-b), *ta(j)* occurs at the end of an intonational phrase and is realized as *taj* whereas in (32-b) it assumes its non-phrase-final form and is realized as *ta* (Larsen 1988; Henderson 2012):

(31)    a.    X-∅-war-ik.
             CMP-A3-sleep-SS
             'S/he slept.'
        b.    **Man** x-∅-war        **taj**.
             NEG  CMP-A3-sleep NEG
             'S/he didn't sleep.'

(32)    a.    X-∅-inw-il        ri    achi.
             CMP-A3-E1-see DET man
             'I saw the man.'
        b.    **Man** x-∅-inw-il        **ta**    ri    achi.
             NEG  CMP-A3-E1-see NEG DET man
             'I didn't see the man.'

Larsen (1987:51) claims that when focus constructions are negated, the negation

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[15]It has been reported that 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).

[16]This particle has been traditionally glossed as an irrealis particle in K'iche' and it does have an irrealis meaning when it is used in counterfactual constructions Larsen (1988). However, it can be used without *man* in a negated sentence because, as Larsen points out, in many dialects of modern K'iche', the negative particle *man* is optional. In the speech of all but one of the consultants that I worked with, *man* is almost always omitted and only the so-called irrealis particle *ta(j)* is used. I, therefore, follow (Pye 2001) and treat *ta(j)* as a negation particle and gloss it as NEG in negated sentences.

[17]In the speech of my consultants, the non-phrase-final form *ta* is always realized in a reduced form as [t] cliticized to the preceding word. See Romero (2012) for a similar observation about the phonological realization of this particle.

particles are placed around the focused expression and, in particular, in the negated (33-b), the negation particle assumes its phrase-final form *taj* (translations are Larsen's):

(33)    a.    Are' x-∅-ch'ay-ow   ri   achi.
              he    CMP-A3-hit-AG DET man
              'He was the one who hit the man.'
        b.    **Man** are' **taj/\*ta** x-∅-ch'ay-ow   ri   achi.
              NEG he NEG    CMP-A3-hit-AG DET man
              'He was not the one who hit the man.'            Larsen (1987:51)

A conclusion that Larsen draws by comparing (33) to (34), where *taj* occurs before a clause boundary, is that since the focused expression in (33) is followed by the phrase-final form *taj*, there is a clause boundary immediately before the verbal complex showing that the focused constituent is separated from the post-focal material[18].

(34)    Le  achi **ma**  x-∅-uu-chooma-j    **taj** chi    x-in-aa-ch'ay-o.
        DET man NEG CMP-A3-E3-think-SS NEG COMP CMP-A1-E2-hit-SS
        'The man didn't think that you hit me.'           Larsen (1987:50)

However, Henderson (2012) claims that focused expressions form a phonological phrase in K'iche' and not an intonational phrase (pp.19-20). Therefore, the focused constituent cannot be followed by the phrase final form *taj* but rather by *ta*, the non-phrase final form of the negation particle:

(35)    **Man** are' **ta(\*j)** x-∅-r-il-o.
        NEG s/he NEG   CMP-A3-E3-see-SS
        'S/HE didn't see him/her.             Henderson (2012:19)

Before going into the details of the experiment, I will mention some relevant points about the claims we have seen so far for the study at hand. For instance, if focused expressions in the data are followed by intonational phrase boundaries, then that will provide counterevidence for Henderson's (2012) claim that focused constituents do not form intonational phrases. If, on the other hand, the pre-predicate expressions are not followed by pauses then that would provide counter-evidence to the claim put forth in Can Pixabaj & England (2011) that topics in K'iche' are followed by a pause. Since the focused expressions are not preceded by any other expression in the experimental stimuli, it is not possible to test whether Nielsen's (2005) claim about up-stepped pitch accents holds true for my data. Yet, it is possible to see if her description of the prosodic structure of K'iche' is reflected in the data I collected. These and the claims about the prosodic reflexes of focus and contrastive

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[18]Larsen's claim is not necessarily a prosodic one as he conceives of the boundary as a syntactic clause boundary (p.51).

topic in other languages will be taken into account in the prosodic analyses of the data.

## 4   The experiment

The discussions in the previous sections provide support for the claim that K'iche' allows string-identical sentences to have different interpretations as in (36) repeated here from section 1:

(36)   **A   Raul** x-∅-war-ik.
      CLF Raul CMP-A3-sleep-SS
      a.   'RAUL slept.'
      b.   'As for Raul, he slept.'

This raises the question as to whether such sentences differ in their prosodic properties. In order to answer this question, I designed and carried out a production experiment with native speakers of K'iche' which aimed to obtain naturally occurring data. In a nutshell, the experiment involved participants listening to conversations accompanied by visual stimuli. The last sentence of each conversation was a target sentence where the pre-predicate expression was interpreted either as a focus or a contrastive topic depending on context. The task for each participant was to utter the target sentence as an answer to a question that is part of the conversation s/he heard. The following sections lay out the details of this experiment.

### 4.1   The participants

The experiment was carried out with 6 (4F, 2M) native speakers of the Joyabaj dialect of K'iche' in Santa María Tzejá, Ixcán, Guatemala in the summer of 2011. All of the participants were bilingual in K'iche' and Spanish and non-literate in K'iche'. They did not report any hearing, speech or visual impairments. The speakers were paid for their participation in the study.

### 4.2   Methods

#### 4.2.1   The stimuli

The stimuli of the experiment consisted of 32 context-target utterance sequences (16 contrastive topic, 16 focus) and 19 fillers consisting of similarly constructed discourses. An example discourse for a focus sentence, which consists of a question-answer pair, is given in (37):

(37)  A:  Chin x-∅-u-b'an      le   wa?
          who  CMP-A3-E3-make DET tortillas
          'Who made the tortillas?'
      B:  **Al  Maria**$_F$ x-∅-u-b'an      le   wa.
          CLF Maria    CMP-A3-E3-make DET tortillas
          'Maria made the tortillas.'


The corresponding discourse where the pre-predicate expression is contrastively topicalized is given in (38). Here, speaker B introduces two discourse participants, *Maria* and *Manuela*, and says something about *Manuela*. Speaker A then asks about *Maria*, and B's answer to that question is the target sentence which is string-identical to the one in (37). Note that in the case of contrastive topic, the stimulus is not just a question-answer sequence but rather has an additional sentence which introduces two discourse participants before the question is asked.


(38)  B:  Al  Maria r-ichbil al    Manuela x-∅-ki-b'an        rikil.
          CLF Maria E3-and CLF Manuela CMP-A3-E3p-make dinner
          'Maria and Manuela made dinner.'

          Al   Manuela x-∅-u-b'an       le  kinaq'.
          CLF Manuela CMP-A3-E3-make the beans.

          'Manuela made the beans.'
      A:  Al   Maria, su     x-∅-u-b'an-o?
          CLF Maria  what CMP-A3-E3-make-SS
          'Maria, what did she do?'
      B:  **Al  Maria**$_{CT}$ x-∅-u-b'an      le   wa.
          CLF Maria     CMP-A3-E3-make DET tortillas
          'As for Maria, she made the tortillas.'


As in the examples above, each discourse was constructed in a way to make only one interpretation of the target sentence possible. The target utterance was always the last sentence of a given discourse and was always an answer to a question eliciting a focused or contrastively topicalized expression. All of the pre-predicate expressions in the target sentences were proper names with penultimate stress. This enabled me to make the pre-predicate argument long enough to be able to clearly observe any associated intonational event. Furthermore, the target utterances had the same number of syllables in all of the stimuli. In this way, I ensured that any differences observed in the prosody were due to a difference in information structure.

Almost all of the people living in Santa María Tzejá where the experiment was carried out are non-literate in K'iche'. Therefore, it was not possible to use written material in the design of the experiment. Rather, the stimuli were recorded as conversations that the participants could listen to. In order not to bias the participants with native speaker

prosody, all of the target sentences were recorded by two non-native speakers of K'iche'. The questions, on the other hand, were recorded by a native speaker of K'iche'. Hence, all of the conversations were between a native and a non-native speaker of the language. To reduce the memory load, each conversation was accompanied by visual stimuli, e.g. pictures of women preparing beans and tortillas for the examples in (37) and (38). For each target sentence, the auditory and visual stimuli were the same across conditions. Figures 1 and 2 show the setup used for the contexts given above.



Maria

**Figure 1:** **An example visual stimulus for focus**



Manuela

Maria

**Figure 2:** **An example visual stimulus for contrastive topic**

### 4.2.2   The procedure

The participants were told that they were going to listen to conversations that consisted of question-answer pairs between a native speaker and two non-native speakers of K'iche'. They were also told that the non-native speakers were interested in hearing how native speakers would say the answers in the conversations. In Figures 1 and 2, clicking on the loudspeaker on the left played the conversation as a whole and clicking on the loudspeaker on the right played the same conversation without the target sentence. The task for each participant was first to listen to each conversation as a whole 1-2 times. Then the participant would listen to the same conversation one more time where the target sentence was removed and repeat the last sentence of the initial conversation as an answer to the question asked in the second conversation.

The participants were seated at a table in front of a laptop. Each participant wore head-mounted Sennheiser HMD280 headphones with microphone. The recordings were made with an Edirol R-09 recorder. 26 out of 192 utterances were excluded due to disfluency and the remaining 166 were included in the prosodic analysis.

### 4.3   Results

The research question I started out with was whether string-identical sentences with different meanings, namely focus and contrastive topic, also differ in their prosodic properties. The previous literature on contrastive topic and focus in K'iche' discussed whether constituents bearing these discourse functions are set off from the rest of the sentence by a pause. In order to see if this claim holds for the data I collected, each utterance was divided into two parts: (i) the pre-predicate part and (ii) the post-focal or post-topical part. I start with a discussion of the prosody of the pre-predicate expressions.

In all of the target utterances, the pre-predicate expression contained a rising pitch movement associated with the stressed syllable of the proper name. This finding is in line with the previous literature, in particular with Nielsen (2005) who claimed that K'iche' has stress-driven pitch accent where L+H* is the default pitch accent on content words.

In 50 (out of 166, ≈30%) utterances, the pre-predicate expression was followed by a pause. In the analysis, any physical pause between the pre-predicate expression and the rest of the sentences was taken into consideration. Such a pause after the pre-predicate expression was a proper pause and did not involve a stop closure because the following expression was always a verbal complex which began with a [ʃ] (*x* in the K'iche' orthography which stands for the completive aspect marker). The 50 pauses were distributed among the two conditions as follows: 29 focus, 21 contrastive topic. The mean duration of the pauses was 0.126s for focus and 0.115s for contrastive topic. A linear mixed effects model with speaker and item as random variables and condition as an independent variable did not yield any significant effect of condition. This finding shows that there is no clear indi-

cation that contrastive topics are distinguished from foci by a pause following them which goes against the claim made by Can Pixabaj & England (2011). As regards the prosodic boundaries following pre-predicate expressions, 77 of the focused expressions (out of 83, 92.7%) and 76 of the contrastively topicalized expressions (out of 83, 91.5%) were marked by a H% boundary tone. This finding shows that the boundary tone following the pre-predicate expressions is not affected by condition. It also goes against the claim that focus constituents do not form their own intonational phrases (Henderson 2012).
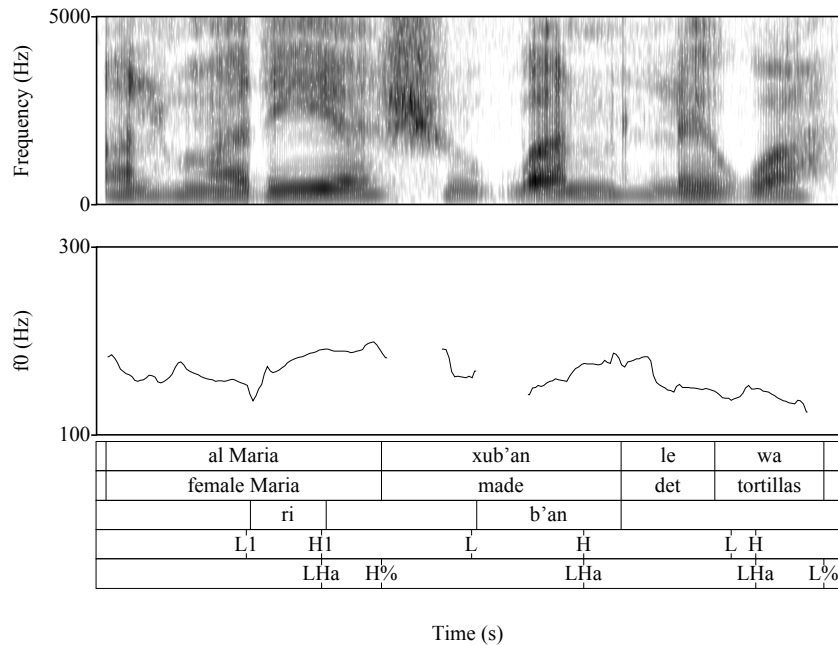


**Figure 3: An example focus sentence**

Following the previous work on the prosody of focus and contrastive topic that was discussed earlier, I have also looked at the following variables: (i) the duration of the stressed syllable in the pre-predicate expression, (ii) the alignment of the rising tone with respect to the onset of the stressed syllable, (iii) the duration of the rise of the F0 contour, (iv) the range of the rise, and (v) the slope of the rise. Figures 3 and 4 provide two example utterances illustrating how the analyses were carried out. In these figures, the first two tiers give the words and the glosses, respectively. The stressed syllables of the pre-predicate expression and the verb are marked in the third tier. The fourth tier provides information about the local minimum and maximum of the rises associated with each content word which are marked by the letters L and H, respectively. The last tier marks the rising pitch movement associated with each content word by LHa as well as the boundary tones, e.g. L% or H%.

Given these conventions about the annotation, Table 3 shows how the variables mentioned above are calculated. Here, I use t($x$) to indicate the time corresponding to $x$
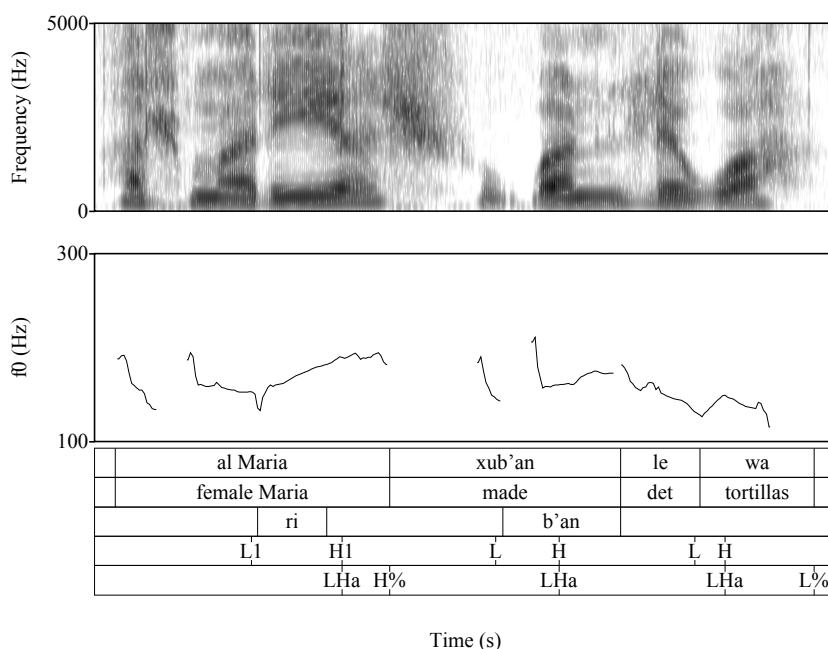
**Figure 4: An example contrastive topic sentence**

and $f_0(x)$ to indicate the F0 value corresponding to $x$:

| Alignment of the L tone | t(L)-t(onset of the stressed syllable) |
|---|---|
| Alignment of the H tone | t(H)-t(onset of the stressed syllable) |
| Duration of the F0 rise | t(H)-t(L) (=D) |
| Range of the F0 rise | $f_0$(H)-$f_0$(L) (=R) |
| Slope of the F0 rise | R/D |

**Table 3: Calculation of the phonetic variables**

Each dependent variable was fitted in a linear mixed effects model with speaker and item as random variables and condition as an independent variable. Among the measurements that were taken, there was a $\sim$6Hz difference in the range of the F0 rise across conditions and the linear models yielded a statistically significant result ($p < 0.05$) only for this variable. Figure 5 is a box plot that shows the distribution of the range of the rise on the pre-predicate expression across conditions. Given that this difference is very small, it may or may not be perceivable by K'iche' listeners. A perception study is needed to find out whether such a small difference is indeed perceivable.

I now turn to a discussion of the prosody of the post-focal or post-topical parts of the target sentences. A total of 104 utterances (64%) had a rising pitch movement on the verb. For these verbs, I carried out the same measurements as above. The remaining
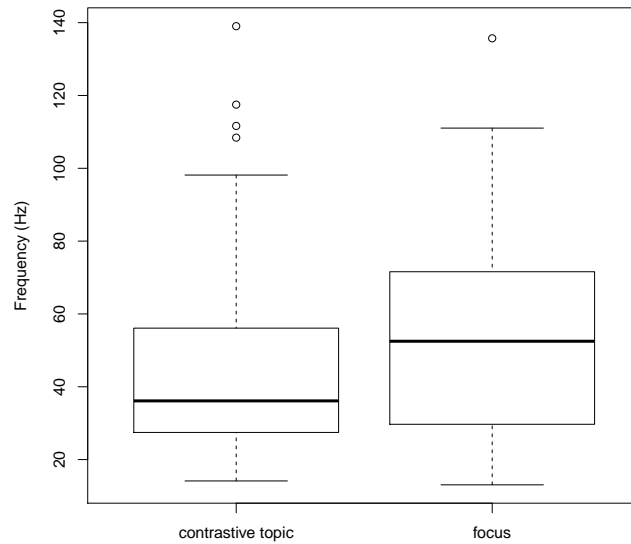
**Figure 5: Range of the F0 rise by conditions**

62 utterances did not have a rise on the verb either because (i) there was tonal truncation (n=54), or (ii) the F0 was flat on the verb (n=2), or (iii) the L or the H target could not be identified (n=6). For these cases, I only compared the H tone realized on the verb (if at all) across conditions. For each verb, I also looked at the duration of the stressed syllable.

As above, each dependent variable was fitted in a linear mixed effects model with speaker and item as random variables and condition as an independent variable. The linear mixed effects models did not yield significant effects for any of the variables.

## 5 Discussion

In the prosodic analyses of the data, each target sentence was divided into two parts, namely, a pre-predicate part and a post-focal or post-topical part, to be able to clearly see the predictions of the previous literature. Contrary to what Can Pixabaj & England (2011) claim, there is no clear indication that focus and contrastive topic are distinguished by a pause between the pre-predicate expression and the post-focal/post-topical expression. On the other hand, the data showed that there is a rising pitch movement associated with the focused or contrastively topicalized expression and a linear mixed effects model yielded a significant effect of condition on the range of this rise. However, the difference across conditions was small (∼6 Hz) and requires a perception study to determine if such a difference matters for listeners. If the small difference in the F0 range that turned out to be significant in this study is actually not perceivable, then context may be the only source of

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the intended interpretation.

In general, one can assume that pragmatic meanings are reflected in prosody because they are represented in the speaker's cognitive model and figure into speech planning. However, at a theoretical level, it is also possible that such an effect of pragmatic meanings on prosody may not always exist. Indeed, there are a series of studies on Yukatek Maya, e.g. Kügler *et al.* (2007); Kügler & Skopeteas (2006), which claim that there is no interaction between topic/focus and pitch manipulations. More generally, recent work suggests that there are languages where no prosodic reflexes of information structure are observed, e.g. Northern Sotho (Zerbian 2006), Hausa (Hartmann & Zimmermann 2007), Wolof (Rialland & Robert 2001) and Thompson River Salish (Koch 2008). A commonality across these languages is the use of word order changes and/or morphology to indicate the changes in information structure. The K'iche' data show that something similar might be going on in K'iche', especially if the significant difference in the range of the F0 rise is not perceivable by listeners.

## 6   Conclusion

This paper presented an experimental study on K'iche' designed to identify whether string-identical sentences with either a focus or a contrastive topic interpretation differ in their prosodic properties. The experiment involved obtaining naturally occurring data from native speakers of K'iche' by having them repeat target sentences they heard in conversations. The acoustic analyses of several variables yielded a significant effect of condition only in the range of the F0 rise associated with focused and contrastively topicalized expressions. However, the difference across conditions is only $\sim$6 Hz which may not be perceivable by listeners. Contrary to previous studies, the data did not support the claim that existence of a pause following the pre-predicate expressions distinguishes contrastive topics from foci.

The future research for this project can proceed in two directions. One is to improve the current experiment by using nominals in the pre-predicate position to prevent any interference of Spanish. The new stimuli should also include non-contrastively topicalized expressions in the pre-predicate position to determine the prosodic properties of such expressions and to compare them with the other two. Lastly, the experiment should be run on more participants in order to obtain a more representative sample. The second direction is to design a perception experiment where the data from the production experiment are used as stimuli. The perception experiment can be designed so that a given target utterance, say one where the pre-predicate expression is focused, can occur both in focus and contrastive topic contexts and the listeners can be asked to judge the acceptability of such utterances. If participants consistently accept a given target utterance in either context, then this shows that they do not make a prosodic distinction between focus and contrastive topic. Results from such an experiment would prove to be useful in interpreting the results of a production experiment especially if statistically significant but phonetically small differences are found.

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