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Author	Lee, Seunghun J. Timee, Tekonnang
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Abstract	<p>疑問文は多くの言語で上昇イントネーションを持つ。本論文は、キリバス共和国で話されるミクロネシア語族のキリバス語における疑問文イントネーションに関する予備的研究である。分析データは、8人の協力者から収集した。補充疑問文は、wh-wordsを前に移動することで得られるが、これらのwh-語はLH*アクセントで実現され、疑問文の文尾のイントネーションはL*アクセントの後に、H%境界トーンが出てくる。真偽疑問文と平常文は同語順であるが、真偽疑問文の文尾は、L*アクセントの後にHL%境界トーンが付く。すべての質問文は上昇するイントネーションを示すが、境界トーンのタイプについては、真偽疑問文が補充質問文の場合と異なる。</p> <p>Interrogatives show rising intonation in many languages. This paper presents a preliminary study on the interrogative intonation in Kiribati, a Micronesian language spoken in the republic of Kiribati. Data from eight participants are analyzed. Content questions are formed by fronting wh-words. These wh-words are realized with an LH* accent, and the interrogative sentence ends with an H% boundary tone that is preceded by an L* accent. Polar questions and declarative sentences have the same word order. Polar questions end with an HL% boundary tone that is preceded by an L* accent. All interrogatives display rising intonation, but polar questions differ from content questions in the type of the boundary tone.</p>
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# A preliminary study on the intonation of Kiribati interrogatives

Seunghun J. Lee (International Christian University, University of Venda)

Tekonnang Timee (Kiribati Teacher's College)

## 要約

疑問文は多くの言語で上昇イントネーションを持つ。本論文は、キリバス共和国で話されるミクロネシア語族のキリバス語における疑問文イントネーションに関する予備的研究である。分析データは、8人の協力者から収集した。補充疑問文は、wh-wordsを前に移動することで得られるが、これらのwh-語はLH\*アクセントで実現され、疑問文の文尾のイントネーションはL\*アクセントの後に、H%境界トーンが出てくる。真偽疑問文と平常文は同語順であるが、真偽疑問文の文尾は、L\*アクセントの後にHL%境界トーンが付く。すべての質問文は上昇するイントネーションを示すが、境界トーンのタイプについては、真偽疑問文が補充質問文の場合と異なる。

## Abstract

Interrogatives show rising intonation in many languages. This paper presents a preliminary study on the interrogative intonation in Kiribati, a Micronesian language spoken in the republic of Kiribati. Data from eight participants are analyzed. Content questions are formed by fronting wh-words. These wh-words are realized with an LH\* accent, and the interrogative sentence ends with an H% boundary tone that is preceded by an L\* accent. Polar questions and declarative sentences have the same word order. Polar questions end with an HL% boundary tone that is preceded by an L\* accent. All interrogatives display rising intonation, but polar questions differ from content questions in the type of the boundary tone.

## Keywords

Kiribati, intonation, content questions, polar questions, responses

## 1. Introduction

The intonation of interrogatives shows how speakers of a language use  $f_0$  to seek information (content questions) or to ask confirmation (polar questions). This paper reports how intonation in Kiribati is expressed by analyzing three pairs of questions and answers: two content questions (wh-questions) and a polar question (yes-no question).

Kiribati is a Micronesian language spoken in the Republic of Kiribati. Studies on the intonation of languages spoken in the South Pacific. While Kiribati has a dictionary (Trussel & Groves 1978), a language learning book by the Peace Corps (Trussell 1979), and some basic descriptions (Harrison & Blevins 1999, Lee & Timee 2019), patterns of the interrogative intonation in Kiribati are underreported. Kiribati is a VOS language and the word order between declarative and polar questions does not differ. In content questions, the fronted wh-word is followed by a relative clause marker.

A handbook on Oceanic languages presents grammar sketches of 43 languages, out of which five languages have a mention of intonation concerning polar questions as in (1). Four languages, Kele, Mussau, Tobati, and Arop-Lokep are described as having a rising intonation. Jabêm does not use intonational means to express polar questions. None of these sketches offer intonation of content questions.

- (1) Reports on question intonation in other Oceanic languages (Lynch, Ross & Crowley 2002)
  - a. Kele (p. 145) “A polar question is either structurally identical to a declarative, but with a rising intonation on the last stressed syllable, ...”
  - b. Mussau (p. 165) “A polar question is expressed by rising intonation, with or without the addition of the tag *ba*.”
  - c. Tobati (p. 202) “There is no special morphology associated with polar interrogative sentences; the word order is the same as for declarative sentences, but with a slight rising intonation.”

- d. Arop-Lokep (p. 266) “Polar questions are usually unmarked grammatically, but have a question intonation (rising finally).”
- e. Jabêm (p. 293) “According to Dempwolff (1939:9), intonation is not used to express a polar question.”

This paper fills the gap in two aspects. A preliminary description of Kiribati interrogative intonation is provided, which has not been reported as far as we are aware. We also explore the nature of the rising intonation in interrogative sentences reported in neighboring languages. After presenting data collection methods in section 2, the results of the interrogative intonation from eight participants will be shown in section 3.

## 2. Data collection

### 2.1. Stimuli

Stimuli include the subject content question (2a), the object content question in (2c), and responses to these questions in (2b and 2d). While the subject response retains the object *maninnara* ‘mosquitos’, the object response does not repeat the subject Mere ‘Mere (personal name)’.

#### (2) Kiribati stimuli: content questions and responses

##### a. Subject content question

antai ae e nori maninnara?

who REL 3SG see mosquitos

‘Who see mosquitos?’

##### b. Subject Response

e nori maninnara Mere.

3SG see mosquitos Mere

‘Mere sees mosquitos’

c. Object content question

tera ae e noria Mere?

what REL 3SG see Mere

‘What does Mere see?’

d. Object response

e nori maninnara.

3SG see mosquitos

‘She sees mosquitos’

For polar questions, the stimuli in (3) were used: the question with an object in (3a), the affirmative response in (3b), and the negative response in (3c). The affirmative response has an identical word with the question after the affirmative word *eang* ‘yes’.

(3) Kiribati stimuli: polar question

a. Polar question

e tangira Nauru?

3sg like Nauru

‘Does she like Nauru?’

b. Affirmative response

eang, e tangira Nauru.

Yes, 3sg like Nauru

‘Yes, she likes Nauru’

c. Negative response

e aki tangira Nauru

3sg neg like Nauru

‘No, she does not like Nauru.’

## 2.2. Participants and recordings

Eight Kiribati speakers were recruited in the Republic of Kiribati who produced the

questions and responses in (2) and (3) as part of a larger study that investigated various aspects of Kiribati phonology (cf. Lee & Timee 2020). The speakers recorded five repetitions of all the stimuli. Elicitations of the response were done by prompting participants with Kiribati questions by an experimenter to trigger more natural intonation in the responses.

### 2.3. Data processing

The recording of the stimuli yielded 280 tokens (7 items \* 5 repetitions \* 8 participants). Recorded data were processed using Praat (Boersma and Weenink 2019), which was then annotated by a research assistant. The annotated data were then processed into f0 plots to examine the pitch contour of intonation in the stimuli sentences. All concerned stimuli were examined to check inter-speaker variation and intra-speaker variation.

## 3. Interrogative intonation in Kiribati: a preliminary description

Descriptive observations of the pitch patterns are presented in this section. Interrogatives show consistent rising intonation at the end of a sentence. When a content question word is present, that word exhibits the highest peak. The notation of the intonation pattern follows the convention based on the Tone and Break Indices (ToBI) (Beckman and Hirschberg 2005). This system is used to indicate pitch accents (H\* or L\*), phrase accents (H- or L-), and boundary tones (H% or L%)

### 3.1. Content questions

The object question in a transitive sentence in figure 1 displays an LH\* on the final syllable of the fronted wh-word *tera* ‘what’. The verb *noria* ‘see’ has an LH- accent that is an L accent followed by an H phrasal tone that is downstepped compared with the LH\* of the wh-word. The subject is the final accentual phrase in the sentence, which has an AP-initial L\* followed by an H% boundary tone. The pitch of the

boundary tone is as high as the LH- accent of the verb, suggesting that the pitch height of the boundary tone is not affected by the presence of a phrasal tone.

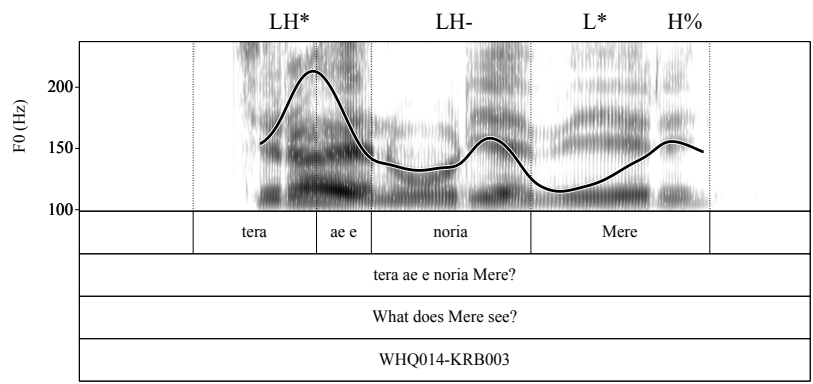


Figure 1. Object question corresponding to (2c)

The response to the object question in figure 2 shows the H\* accent intonation at the final syllable of the verb. Although the object *maninnara* ‘mosquitos’ is new information, the intonation is no different from a declarative sentence with an L% boundary tone. All eight speakers display the intonation pattern in figure 2, which means that it is the dominant intonation pattern for a response to an object content question.

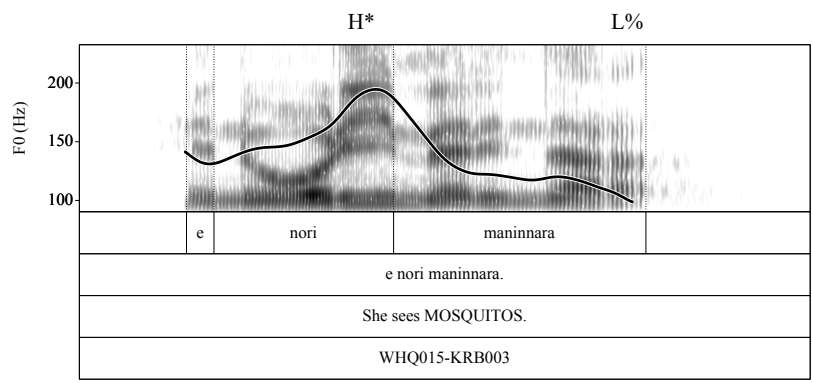
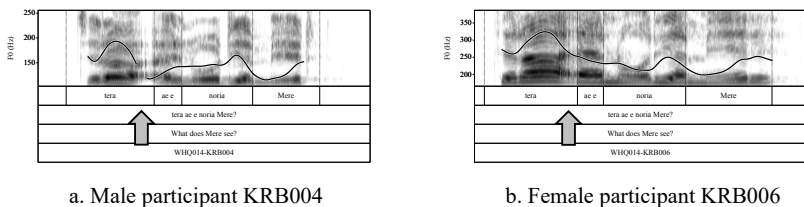


Figure 2. Response to the object question corresponding to (2d)



Two of out six participants show laryngealization at the end of the fronted wh-word *tera* ‘what’. As shown in figure 3, the LH\* accent peaks at the midpoint of the final vowel of the wh-word, followed by a creakiness in the acoustic signal. The relative marker *ae* and the subject agreement *e* appear after the laryngealized portion in the signal. Other speakers do not display this type of creaky phonation. Given that the two speakers are male and female, the presence of creakiness is not due to the gender of an interlocutor.



**Figure 3. Laryngealization at the end of the wh-word**

The subject question displays a similar intonation pattern as the object question. The wh-word *antai* ‘who’ is the most prominent part in the sentence with the LH\* accent. The verb displays the LH- phrasal tone. The final AP *maninnara* ‘mosquitos’ shows the L\* accent followed by an H% boundary tone. The L\* accent is at the end of the first syllable of the object noun, suggesting that the target of the L\* is not the penultimate syllable. Unlike the object question, no participant shows laryngealization at the end of the wh-word *antai* ‘who’.

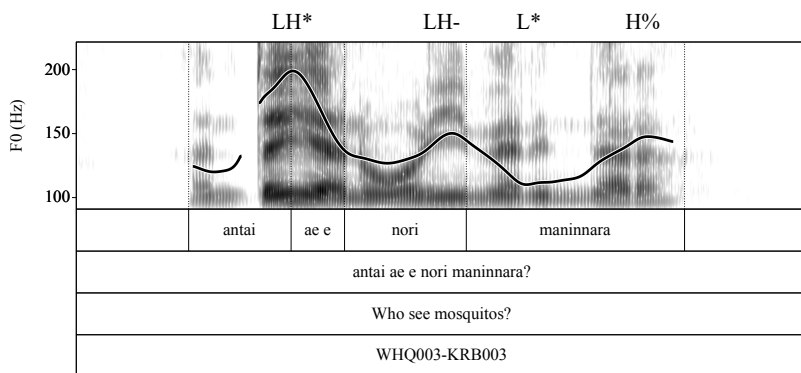


Figure 4. Subject question corresponding to (2a)

The intonation of the response to the subject question shows that the most prominent part is the initial verb, where H\* aligns with the final syllable. The object noun *maninnara* ‘mosquitos’ displays a downstepped H- phrasal accent and the subject *Mere* does not show prominence. All eight participants demonstrate the intonation pattern as shown in figure 5, suggesting that intonation does not play a role in marking newly introduced information in a response.

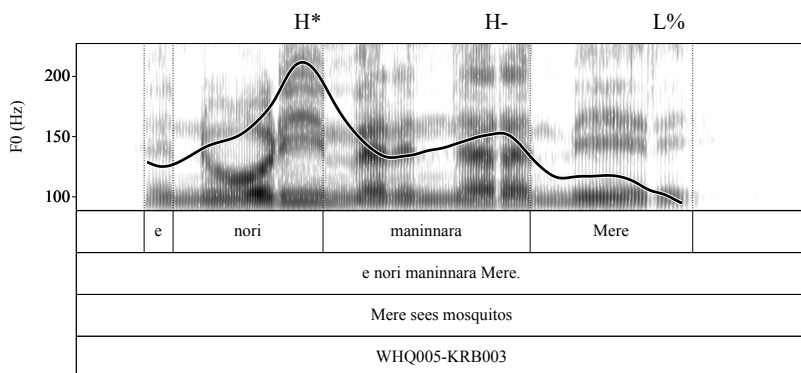


Figure 5. Response to the subject question corresponding to (2b)

### 3.2. Polar questions

Stimuli of polar questions are limited to transitive sentences with a pronominal subject and an object. Across all participants, the intonation of polar questions is shown in figure 6. The initial AP with the verb displays an H\*L accent, different from the LH-pattern observed in the content questions. A direct comparison between the two types of questions is not possible because the verb in the content questions has two syllables (*nori* ‘see’) and the verb in the polar question has three syllables (*tangira* ‘like’). Further research is required to explore whether the AP with a verb has a final H-phrasal accent or an H\* accent. All participants display L\*HL% in the final AP that is the object noun *Nauru*. While the boundary tone of content questions is H%, the polar question shows the HL% boundary tone.

Two patterns of prominence distribution were found in the polar questions. Five participants display a higher prominence in the final AP as in figure 7a, an intonation pattern that was not observed in content questions. The other three participants do not exhibit a final AP that has more prominent intonation. Even so, the final AP has a higher H in the HL% boundary tone than what we would expect in a declarative sentence.

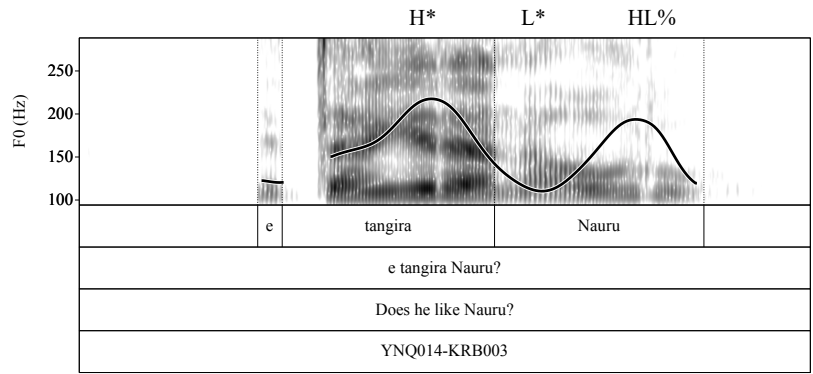
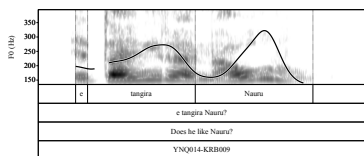
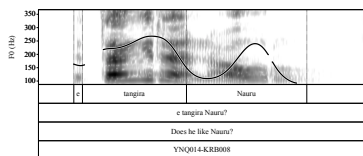


Figure 6. Polar question corresponding to (3a)



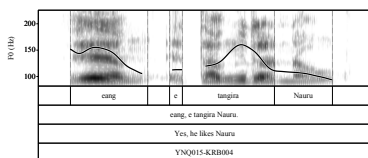
a. Prominent final AP (5 participants)



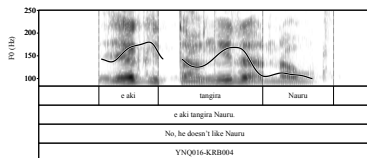
b. Less prominent final AP (3 participants)

**Figure 7. Two types of polar questions**

Two types of responses to the polar questions were elicited: a positive response and a negative response. The positive response begins with the response *eang* ‘yes’ that is followed by a declarative sentence as in figure 8a; the intonation pattern shows phrasal prominence in the AP with the verb, and the object noun being part of the previous AP. The negative response in figure 8b demonstrates that the negative marker *aki* ‘not’ receives the H\* accent, and the following words form a single AP with an H\* in the verb followed by a declension until the end of the phrase.



a. Positive response (3b)



b. Negative response (3c)

**Figure 8. Responses to a polar question**

### 3.3. Summary

An examination of Kiribati interrogative intonation of eight speakers has shown that the phrasal accent associated with the verb is robust in questions as well as in declarative responses. The fronted *wh*-words in content questions receive prominence. The final AP of a content question has an L\*H% boundary tone, while the final AP of a polar question displays an L\*HL% intonation. We also found a potential role of

creakiness at the end of the object wh-word, which needs further research.

#### 4. Conclusion

The intonation of polar questions is often described as having a final rising intonation. An analysis of the Kiribati intonation demonstrates that a rising intonation is present in the pattern where an L\* is followed by an HL% boundary tone. All participants in this study show the HL% boundary tone in polar questions and H% boundary tone in content questions. Rising intonation characterizes all question types in Kiribati, but the difference lies in the presence of an additional L tone after the rising intonation. This paper proposes that the rising tone in the question intonation is due to the presence of an L\* in the final AP that is followed by H% or HL% boundary tones.

This preliminary study also raises further questions: (a) the intonation pattern of adjunct questions (how, where, why, when), (b) effects of word length, and (c) the alignment of prominent syllable with a long vowel or stress and H\* or L\*. These questions will provide us with a more detailed understanding of intonation patterns in Kiribati, and also suggest what patterns to investigate in other Oceanic languages.

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