What does the question sound like? Exploring wh- and yes-no interrogative prosody in Yami

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ABSTRACT

This paper explores two types of interrogative prosody in Yami, an Austronesian language spoken in Taiwan. (Semi-) spontaneous data collected through the Map Task technique [1] were used and acoustic parameters such as pitch accent shapes, boundary tones, pitch range, and speech rate were examined. The results show that all parameters were used to differentiate interrogative prosody in Yami. The majority of the wh-questions have a falling intonation pattern (H* H* L% or H* H+L* L%), while yes-no questions have a rising pattern (L+H* H% or L*+H H%). Additionally, the mean maximum F0 in wh-questions is significantly higher than that in yes-no questions. Speech rate also differs between wh- and yes-no questions, with the former being spoken significantly faster than the latter.

Keywords: Interrogative prosody, intonation, pitch accent, Yami, Austronesian language.

1. INTRODUCTION

Yami is a Philippine language spoken on Orchid Island, a community off the southeast coast of Taiwan [2, 14]. As a minority language, Yami has received increasing attention among syntacticians [3, 12, 13] and sociolinguists [6, 7, 8, 11]. Yami prosody, in contrast, has remained an understudied area. From the literature currently available, there are only two studies providing brief impressionistic descriptions of the stress pattern and intonation of Yami. [12] noted that stress in Yami is phonemic, and the default stress falls on the last syllable of a lexical word, and [3] reported that yes-no questions in Yami have a final high boundary tone.

Since these observations are inadequate for us to capture the general picture of Yami prosody, we look to studies on the prosody and intonation of other Austronesian languages for insights as well. [4, 9, 15] investigated the speech prosody in Paiwan, Tongan, and Western Cham respectively and pointed out that declaratives and wh-questions have a low or falling final boundary tone, whereas yes-no questions have a high final boundary tone. In Paiwan, [4] further pointed out that pitch range also facilitates distinguishing wh-questions from yes-no questions. Specifically, the pitch range was generally higher in yes-no questions than in wh-questions.

In addition to pitch, speech rate also serves as an important prosodic cue signalling interrogativity. For example, [17] pointed out that yes-no questions in Manado Malay are spoken faster than their declarative counterparts, with the difference being clearest in the last syllable immediately preceding the sentence boundary.

In our pilot study on the interrogative prosody in Yami, we look at three of the four types of interrogatives [13]. We will focus on wh-questions and two subtypes of yes-no questions. The reasons are threefold. First, the position where wh-words occur is a potential position for narrow focus [18]. Thus, we examine whether the wh-elements carry prosodic prominence and whether there is intonational contrast between wh-questions and broad focus declarative sentences. Second, it is commonly found that yes-no questions and declaratives share the same syntactic spellout and are expressed by prosody only [17]. Following this, we explore how prosody is exploited by Yami speakers. Third, yes-no questions can be further divided into confirmation-seeking questions (CSQs) and information-seeking questions (ISQs) and we also examine whether these subtypes behave differently in Yami.

2. METHODS

2.1. Participants and Procedures

Nine pairs of native Yami speakers (18 total), aged from 34 to 58 at the time of recording, were recruited for this project. A practice session was administered prior to the recording session to help participants become familiar with the task (50 of minutes of recording in total.

2.2. Corpus

In order to ensure the naturalness of the utterances, (semi-) spontaneous speech data were collected through a modified interactive map task [1]. In this

task, one participant serves as an *asker* to produce the wh-questions (and yes-no questions if necessary); the other participant serves as an *instruction-giver* to tell his/her partner what (s)he sees in a certain village. The pairs 'travelled' across the six villages on Orchid Island and worked together to find ten differences between their maps.

2.3. Acoustic parameters

Previous studies on intonation [5, 9, 10, 15, 17] suggest that pitch accent shapes, boundary tones, pitch range, and speech rate play an important role in differentiating interrogative sentences from declaratives. Accordingly we examine how these acoustic parameters are manipulated by Yami speakers to signal different sentence types.

2.4. Formation of interrogatives in Yami

According to the game design, the targeted wh-words were *do andʒin* 'where' and *ikoŋ* 'what'. Although there does not seem to have fixed word order in Yami [3], our data show that *do andʒin* 'where' tends to occur mostly in sentence-final position and *ikoŋ* 'what' usually occurs in sentence-initial position (these appear in bold in Table 1). The yes-no questions showed no syntactic variation.

Table 1: Wh-words in different sentence positions.

do andʒin	**ja maŋaɪ ɖu andʒin?**	'Where are you going?'
	ɖo andʒin maŋŋaɪ ja?	
ikoŋ	***ikoŋ* mo ŋimadʒita?**	'What did you see?'
	mo ŋimadʒita so *ikoŋ*?	

3. RESULTS

161 interrogatives (133 wh-questions and 28 yes-no questions) and 116 declaratives were examined in this study. The results are as follows.

3.1. Pitch accent types and distribution

We proposed six pitch accent types in Yami. There are two monotonal accents, H* and L*, and four bitonal accents, H+L*, H*+L, L+H*, and L*+H. H+L* and H* are the most frequently observed pitch accents in wh-questions and declaratives. Another falling tone, H*+L, in some cases, is also aligned within the pre-boundary syllable in declaratives. The rising tone, L+H*, is usually aligned with the first syllable in *ikoŋ*-initial sentences. For yes-no questions, the two rising tones, L+H* and L*+H, are frequently aligned with the pre-boundary syllable in a clause. The low tone, L*, is sporadically distributed in wh-questions and declaratives (Table 2).

3.2. Boundary tones

Three boundary tones, L%, H% and M% are observed in Yami and are important cues to sentence type. Despite a few variations, the boundary tone patterns in Yami are largely predictable.

3.2.1 Wh-questions and declaratives

In terms of distribution, for *do andʒin* 'where', the data show that despite the position of the wh-word, sentences are most frequently aligned with a low boundary tone (86.7%), followed by a mid boundary tone (10%), and are least frequently marked with a high boundary tone (3.3%). Figure 1 demonstrates the canonical intonational pattern of a *do andʒin*-final sentence and figure 2 the minority M% pattern.

Figure 1. *do andʒin*-final sentence ending with L%. 'Where are you going?'
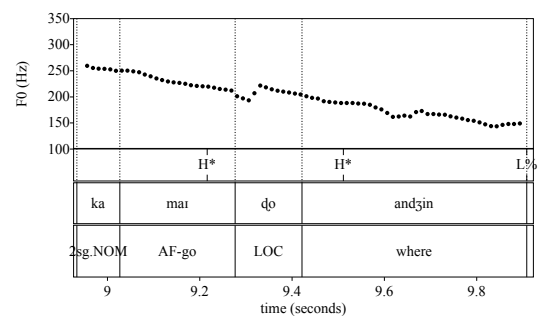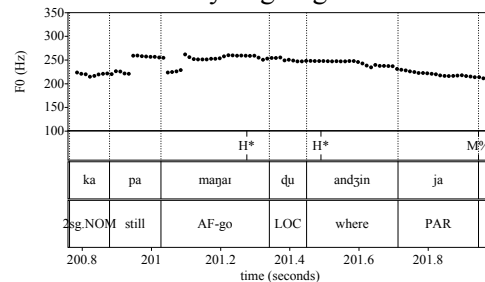

Figure 2. *do andʒin*-final sentence ending with M%. 'Where are you going?'

For another wh-word *ikoŋ* 'what', the data show that when it occurs in utterance-initial (the default) position, 96.7% of the sentences are aligned with a low boundary tone. When *ikoŋ* occurs in utterance-final position, the sentences may be aligned with a low or a high boundary tone. Figure 3 illustrates a canonical sentence starting with *ikoŋ* and Figures 4 and 5 illustrate the alternate boundary tones in *ikoŋ*-final sentences uttered by the same female speaker.

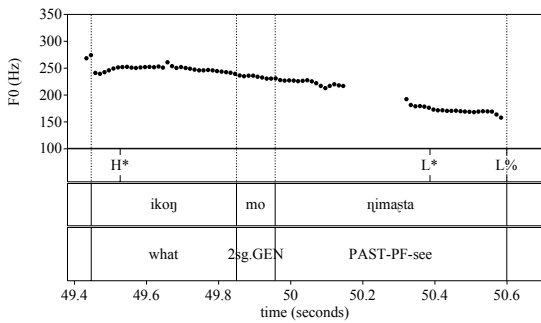**Figure 3**. *ikoŋ*-initial sentence ending with L%. 'What did you see?'

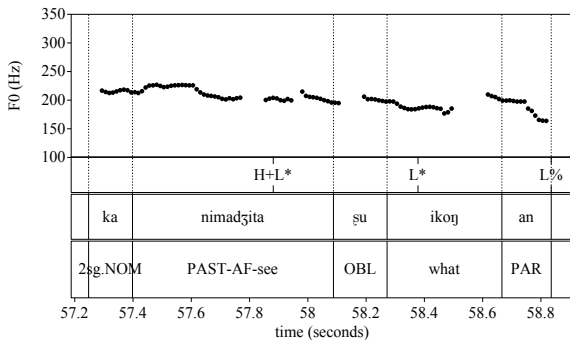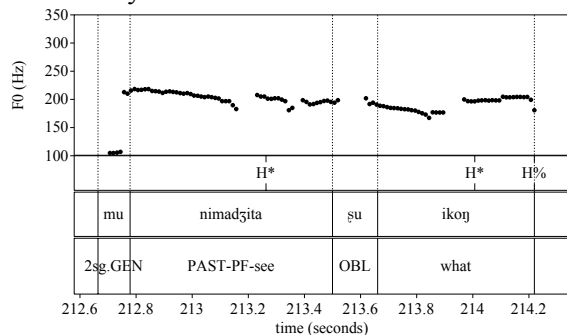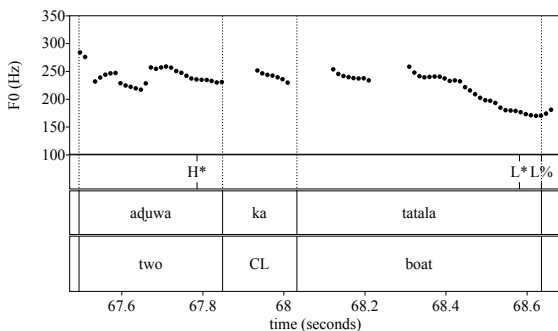**Figure 4**. *ikoŋ*-final sentence ending with L%. 'What did you see?'

Figure 5. *ikoŋ*-final sentence ending with H%. 'What did you see?'

A falling pattern is also observed in declaratives (Figure 6).
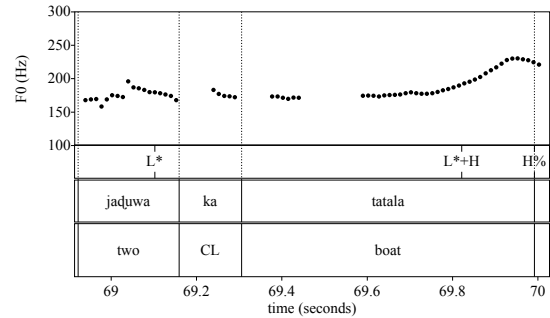
Figure 6. Declarative sentence ending with L%. '(I saw) two boats.'

3.2.2 Yes-no-questions

Yes-no questions, our data show that both CSQs and ISQs are consistently marked with a high boundary tone (Figure 7).

Figure 7. Yes-no question ending with H%. '(You saw) two (boats)?'

Taken together, the distribution of pitch accents and boundary tones in Yami are summarized in Table 2.

Table 2. Canonical sentence intonation in Yami.

Sentence type	Subtype	Sentence intonation			Freq.	Total	(%)
	Sentence-final	**H***	**H***	**L%**	**29**	**60**	**48.3**
		H*	**H+L***	**L%**	**21**	**60**	**35.0**
do andʒin 'where'		Others			10	60	16.7
	Sentence-initial	H*	H*	L%	4	6	66.7
		H*	H+L*	M%	2	6	33.3
		Others			0	6	0
	Sentence-initial	**H***	**H+L***	**L%**	**28**	**61**	**45.9**
		L+H*	**H+L***	**L%**	**27**	**61**	**44.3**
ikoŋ 'what'		Others			6	61	9.8
	Sentence-final	H*	L*	H%	2	6	33.3
		L*	L*	H%	2	6	33.3
		Others			2	6	33.3
Declaratives		**H***	**H+L***	**L%**	**68**	**116**	**58.6**
		H+L*	**H+L***	**L%**	**21**	**116**	**18.1**
		Others			27	116	23.3
	CQS	**L*+H**	**H%**		**8**	**20**	**40**
		L+H*	**H%**		**6**	**20**	**30**
Yes-no questions		H*	H%		4	20	20
		Others			2		10
	IQS	**L+H***	**H%**		**4**	**57.1**	**7**
		L*+H	**H%**		**2**	**28.6**	**7**
		Other			1	14.3	7

3.3. Pitch range

In terms of pitch range, the statistical analysis shows that the mean maximum F0 is significantly different across sentence types (F [2, 216] = 6.926, $p < .01$). Post hoc comparisons suggest that the mean maximum F0 in wh-questions and declaratives are significantly higher than that in yes-no questions yes-no questions ($p = .017$ and $p = .001$ respectively). The difference between wh-questions and declaratives was not significant ($p = .372$).

**Figure 8.** Mean maximum/minimum F0 of pitch accent across sentence types.
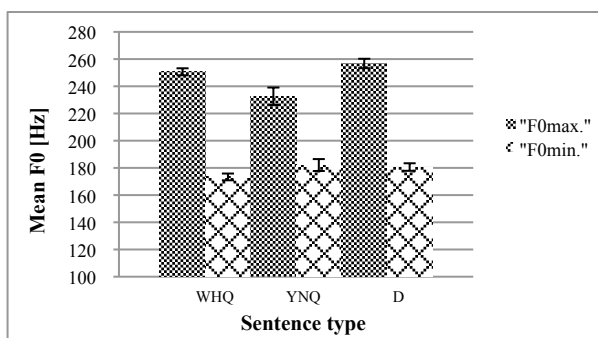
Global pitch range (difference between initial and final F0 height [10]) differs significantly among across sentence types (F [2, 185] = 5.029, $p < .05$). A post hoc analysis indicates a significant difference in global pitch range between declarative and yes-no questions, with the former being more expanded than that of the latter ($p = .008$). However, no significant difference in global pitch range was observed between the two types of interrogatives ($p = .100$).

3.4. Speech rate

Speech rate, defined by syllable per second [17], also differs among the three sentence types (F [2, 302] = 13.715, $p < .01$) in Yami. The post hoc analysis indicated that wh-questions in Yami were spoken significantly faster than yes-no questions (p = .002) and declaratives (p < .001). But there was no significant difference in speech rate between yes-no questions and declaratives (p = .645).

Figure 9. Speech rate across speakers.
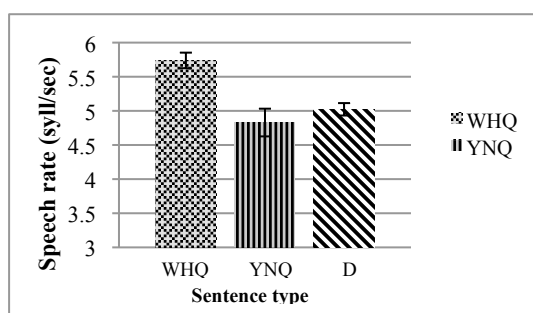
4. DISCUSSION

The present study examined two types of interrogative prosody – wh-questions and yes-no questions in Yami. The results indicate that pitch accent shapes, boundary tones, and speech rate function as important cues differentiating the two question types. In Yami, wh-questions are syntactically marked by wh-words and are characterized by falling intonational patterns such as

H* H* L% and H* H+L* L%, which are analogous to the intonational pattern of declaratives. The intonational pattern of the two subtypes of yes-no questions were also investigated. The results show that while yes-no questions are not syntactically distinct from declaratives in Yami, they are prosodically contrastive. As discussed above, yes-no questions in Yami take a rising tone (L+H* or L*+H) and are aligned with a final high boundary tone, while declaratives have a falling pattern. The results also suggest that in contrast to languages like Majorcan Catalan [16] and Mandarin [19], whose CSQs and ISQs are syntactically ambiguous but prosodically discernible, both of these questions in Yami have the same syntactic frame and are unexceptionally marked with a high boundary tone.

With regard to pitch range, our data show that the pitch range was higher in wh-questions than in yes-no questions in Yami. Interestingly, these results are different from those reported for Paiwan [4], where the pitch range was generally higher in yes-no questions than in wh-questions. Global pitch range, however, did not facilitate distinguishing the two types of interrogatives in Yami.

Finally, speech rate also facilitates distinguishing the two types of interrogative prosody. Our data show that in Yami, speech rate was significantly faster in wh-questions than in yes-no questions. This finding might partly arise from the game design. As mentioned earlier, in the task, one participant serves as an *asker* and repeatedly produces the same wh-questions throughout the game. The *askers* may thus speak faster when they become more familiar with this game. The slower yes-no questions, also produced by the *askers*, seem to imply the *askers'* uncertainty about the instruction given by their partners. However, unlike Manado Malay in which yes-no questions are spoken faster than declaratives [17], the present study did not find observable differences in speech rate between yes-no questions and declaratives.

Furthermore, as in Paiwan [4], word-prosody in Yami seems to be independent of sentence-level. As shown above, when the well-formed prosodic word *tatalá* 'boat' is uttered with a yes-no question prosody, the word level prosody (a low F0) seen in Figure 6 is overridden by the high boundary tone (Figure 7). This provides evidence for the independence of word-level and sentence-level prosody in Yami.

Given that (Taiwanese) Austronesian language prosody is severely under researched, these results not only provide preliminary view of Yami interrogative prosody, but serve as a starting point for expanding research on of prosodic structure of Austronesian languages more generally.

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