
Discourse and information structure in Kadorih

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1. Overview

In Inagaki (2014), I introduced prosodic features and constructions signaling information structure in Kadorih such as topic-comment, entity-introducing, event-reporting and identificational (or cleft) constructions. In this paper, I will point out that the description of prosody such as pause, pitch, length and loudness is important for analyzing information structure of Kadorih. Among these prosodic features, pause and length have not been an issue drawing sufficient attention in previous studies on information structure. This paper will describe the role these prosodic features play in discourse and demonstrate their importance for interpreting information flow, boundary or structure. I will show information structure of Kadorih within the framework proposed by Chafe (1976), Prince (1981), Lambrecht (1994) and others.

As Chafe (1979) pointed out, pause and other prosodic features function as delimiters in a discourse. In addition, as described in numerous studies, including Inagaki (2014), prosodic features crucially relate to understanding of a sentence in terms of information structure. These aspects in speech tend to be missed when analyzing a spoken text which has already been transcribed by a linguist. This might be because we believe it is more important to see distinctive formal or segmental units which associate with semantic meanings. However, non-distinctive properties, or even non-verbal properties may well be clues for an addressee to interpret the addressor's speech in terms of information structure. For example, eye movement directed to some entity in the deictic world may signal a topic of the following statement.

In the following sections two issues will be discussed. First, in section 2, distribution and behavior of prosodic features in discourse will be considered. Pause, length, and pitch will be analyzed from the viewpoint of acoustic phonetics. Subsequently, prosodically supported structures will also be analyzed. Second, section 3 will illustrate the role of these prosodic features in signaling information structure.

2. Discourse analysis

In this section, I will focus on prosody in Kadorih discourse. In the following subsections, pause and its surrounding prosodic features, length and pitch will be discussed.

2.1 Pause in discourse

2.1.1 Overview

The duration and number of pauses can vary considerably among specific discourse instances. This can be clearly seen if we compare the details of pauses in different texts. Table

1 summarizes the number of pauses per minute and the minimum, maximum and average pause duration in four discourse samples given by four Kadorih speakers.

Table 1: The number and duration of pauses in different texts

text	speaker	number/min.	duration(avg.)	duration(min.)	duration(max.)
A	female	25	816ms	115ms	3174ms
B	female	20	688ms	125ms	1155ms
C	male	19	728ms	157ms	2140ms
D	male	18	1703ms	134ms	8844ms

The texts selected here are all narrated stories belonging to the genres of folktale, daily happening, and procedure explanation.

The number of pauses per minute seems to vary from text to text, but the figures are not significantly different from each other. These figures (18 to 25 per minute) can be recalculated as 3 to 4 pauses per 10 seconds. And I believe this pausing rate is true for many fluent Kadorih speakers. If we count the number of pauses in a text uttered by a less fluent speaker, for example, we will find more than 6 pauses per 10 seconds, in other words, more than 36 pauses per minute. This is an unlikely situation for Kadorih native speakers. By contrast, we will have very few opportunities to find an extreme case of a speaker who can keep almost nonstop talking for many minutes at the rate of only 1 or 2 pauses per 10 seconds.

What is common to the pause duration in the four texts here is the minimum value. The speakers tend to use a short pause of 100 to 200 milliseconds. If a pause is produced for 70ms, it is too short to perceive. Generally speaking, silent intervals over 250ms are reliably pauses, and those under 50 or 60ms are not considered as pauses (Robb et. al. 2004, cf. Kendall 2009).

On the other hand, it should be noticed here that pauses ranging from 300ms to 700ms are most commonly used by all the above speakers. However, as can be seen in Table 1, the values of maximum duration of pauses differ from text to text, or speaker to speaker. That is why the average pause duration varies and ranges from 688ms to 1703ms here.

2.1.2 Pre-pause elements

This subsection introduces what kinds of elements occur before pause. More or less all segments, syllables, prefixes (probably with the exception of the infix <*an*>), words, phrases, clauses, or sentences can be followed by a pause. The list in (1) contains elements frequently occurring before pause, other than clause- or sentence-final elements.

(1) a. Fillers: *anu(i)* ‘um’ , *e* ‘er’, *he* ‘yeah’, *nah* ‘well’, *nng* ‘hm’, *o* ‘er’
b. Interjections: *(a)yu* ‘Come on!’, *ei* ‘Hey!’, *i* ‘Hey!’
c. Conjunctions: *jadi* ‘so’, *inonko* ‘and then’, *iyo* ‘then’, *rimai* ‘the story goes that’, *sehingga* ‘so that’, *tahpi* ‘but’, *turus* ‘and then’
d. Discourse connective phrases: *(amun) jadi orih* ‘after having been done, insomuch that’, *umbot orih* ‘after having finished that’
e. Approximation adverb: *kira-kira* ‘roughly’, *kurang-labih* ‘more or less’, *mungkin* ‘possibly’, *sekihtar* ‘approximately’

Some other function words such as prepositions, classifier-like abstract nouns and the relativizer *(i)jo* are also frequently followed by a pause. The relativizer *(i)jo* precedes a pause

+ clause, prepositions precede a pause + word/phrase, and abstract nouns precede a pause + word/phrase as in (2)–(4). In this paper, pauses are transcribed by three dots (…).

(2) Pre-pause element: relativizer

a. *tohtok orih tahkan dasar sarupih jo ... pakakisung ah nai rih*
'The cutting [of the stem post] from the bottom of a side plank which … is the highest part [of a boat when we turn the boat downside up]'

b. *orih naing gunai jo ... palapah pisang naing arai tuh rih*
'That's the function which … of this so-called "palapah pisang"'

(3) Pre-pause element: preposition

a. *harun to masang aang anui rih ... aang ... tohun sarupih jo pakadiang ah rih*
'Only after that we install [palapah pisang] on um … in … the midst of that top side plank'

b. *kira-kira himat diang isut umba ... sambungan doro jo sarupih numur duo rih*
'Roughly, it must be installed at little higher place than … the seam [of the No.3 side plank] with the No.2 side plank'

c. *amun io nokuh ... booi salut oh ...he jelas io anak Rungan*
'If it (=river) goes to … the flow goes downriver … yeah it is for sure the tributary of Rungan river.'

(4) Pre-pause element: classifier-like abstract noun

a. *kira-kira kakahpai sekihtar karo ... ohpat senti ka ih*
'Roughly, its (=beam installed on the bottom plank) thickness is about (as much as) … four centimeters as well, the thickness.'

b. *"peda borai to kumai" hion ... Tempun Tajawun*
' "We are sick of eating" said … Tempun Tajawun'

c. *holang ... uut Jehoi umba uut ... Rungan*
'The border [area] between … a headstream of Jehoi and a headstream … of Rungan'

d. *amun io nyalut nokuh hila ... booi*
'If it (=river) flows to the direction … downriver'

2.2 Lengthening in discourse

This section describes a phonetic phenomenon of vowel/nasal lengthening, which is common in Kadorih discourse. It should be kept in mind that the duration of vowel/nasal depends on the speech rate, and that it can also vary among discourse samples.

The following examples in (5) are two extracts from the same story. In all examples below, lengthened segments are transcribed by capital letters (e.g. AA).

(5) a. *ihtOO anui hinOO nguting ah koi-koIIk sekihtAAr karo duo sentII kahajon bindang ah ...*
'We, um, again, cut it (=galvanized iron) small (into pieces) with scissors, the size of a piece is about (as much as) two centimeters.'

b. *kira-kira kakahpai sekihtar karOO ... ohpat senti ka ih ... kakahpai rih ...*
'Roughly, its thickness is about (as much as) four centimeters as well, the thickness.'

As can be seen in (5a), many word-final vowels may undergo lengthening at the same time in a single intonation unit. (5a) includes five lengthened vowels: *o* of *ihto* 'we (inclusive)', *o* of *hino* 'again', *i* of *koi-koik* 'small', *a* of *sekihtar* 'approximately', and *i* of *senti* 'centimeter'. The sequence *sekihtar* + *karo* 'approximately + quantity' in (5a) is a very useful expression for talking about quantities, and is also used in other places in the text. When we compare the same sequence used in other places, we will find both *sekihtAAr karo* as in (5a) and *sekihtar karOO* as in (5b).

The underlined elements in (5), *sekihtar*, *karo*, *ihto* and *hino* are frequently in texts explaining various procedures. We can easily draw comparisons of vowel length between them. The table given in (6) shows the result of the comparisons.

(6) Vowel length

word	sample	in (5ab)	average	minimum	maximum
sekiht AA r	12	372ms	372ms	234ms	602ms
kar OO	11	358ms	469ms	208ms	729ms
iht OO	8	506ms	387ms	252ms	506ms
hin OO	16	421ms	317ms	194ms	469ms
sekiht a r	15	85ms	79ms	60ms	105ms
kar o	8	60ms	61ms	49ms	89ms
iht o	27		106ms	57ms	167ms
hin o	7		106ms	77ms	144ms

The data of lengthened vowels is shown in the top four rows under the header, and that of normal short vowels can be found in the bottom four rows. It is obvious that the lengthened and normal short vowels are categorically different in duration from each other. While the final short vowels are usually produced with the duration ranging from 60ms to 140ms, the lengthened vowels are usually within the range of 200ms to 600ms.

Even though not frequently, prefixes can undergo lengthening. Some examples are given in (7) below.

(7) a. *ohpat sentII ka.. ... e kAAmihpih ah anui nai ...*
'four centimeters as well, … er, its thinness …'

b. *io rih eam io ahkaNN karo sapating lah amun tAA ... pingas atawa iOO ... EE hakAAsatuk umba injah ah gi jorIIh hapa nahai amun jo ...*
'It (=boat) won't get loose anymore, even if it is stomped on, or even if it, er, comes into contact with each other (=with another boat) when controlling, or even if …'

In (7a), the vowel of a prefix *ka-* is lengthened. This prefix morphologically derives an abstract noun by attaching to an adjective such as *mihpih* 'thin'. Similarly, prefixes *ta-* and *haka-* undergo lengthening in (7b). In these cases, lengthening probably applies at the first foot-final syllable of each word: (*ka*)(*mih.pih*) consists of two feet (*ka*) and (*mih.pih*), and the first foot-final syllable is *ka*), (*ta*)(*pi.ngas*) has (*ta*) + (*pi.ngas*) and the relevant syllable is *ta*), and (*ha.ka*)(*sa.tuk*) has (*ha.ka*) + (*sa.tuk*) and the relevant syllable is *ka*).

2.3 Roles of pause and lengthening

This section describes the roles played by pauses and lengthening in discourse. An example in (8) includes a chain of clauses and pauses extracted from the text of procedure explanation.

(8) a. *mahkUU nah* ...
b. *amun io jadi uras ndai pahku AAh uras segAAh* ...
c. *sarupih jo mapan tawang tuh rih nyamah tatukup nai uras umbot pahku AAh* ...
d. *harun to anUU* ...
e. *EE ngurah* ...
f. *nguhca nyahtOOng* ...
g. *ahkan hapa to malisan AAh* ...
h. *lisan tuh rih* ...
i. *sanyapur umba minyAAk galapung nyahtong rih nyapur umba minyAAk harun io manjadi lisAAn* ...

Translations of the respective extracts and durations of each pause are given in (9).

(9) a. to nail, well …(1390ms)
b. when the nailing is completely done and all [of them] are stable …(407ms)
c. [when] the nailing is completed for the side planks [which were jointed with] the bottom plank all the way up to the stem ...(1001ms)
d. only after that we, um …(917ms)
e. er look for …(856ms)
f. pound resin …(1170ms)
g. for us to use for caulking it (=boat) …(1046ms)
h. that caulking glue …(1084ms)
i. mixed with oil, the resin powder [we] mix it with oil, only after that it becomes caulking glue …(659ms)

There are two kinds of pauses, namely hesitation and juncture pause (Laver 1994: 537–539). The lines in (8a) and (8d) end, respectively, with fillers *nah* and *anUU* followed by a long pause respectively (1390ms and 1001ms). This kind of pause can be seen as hesitation pause produced after a hesitation filler. In addition, hesitation is also expressed by final lengthening on the hesitation fillers such as *anUU* in (8d) and *EE* in (8e).

On the other hand, the final pause in (8b), which is realized after a subordinate clause, can be seen as a juncture pause. This kind of pause is useful for a narrator to show a boundary between sentences, clauses, as well as subject–predicate, or topic–comment pairs. In fact, the relatively short pause (407ms) between (8b) and (8c) does not show a boundary between a subordinate and main clause. The clause in (8c) is only juxtaposed within the large subordinate clause which extends through (8b) and (8c). The clause in (8c) supplements a condition which is expressed in the previous clause in (8b), that is, 'when the nailing is done'. Interestingly, this supplementation by juxtaposition in Kadorih discourse often co-occurs with final lengthening. The shared topic argument *pahku AAh* 'the nailing' which is dislocated in (8b) and appended in (8c) plays a 'pivot' role for juxtaposing, and lengthened syllables demarcate the clauses obtained by means of juxtaposition. Of course, the intervening supplemental clause *uras segAAh* 'all are stable' is also a juxtaposed clause, and the boundary is also indicated by final lengthening.

This kind of clause combining by demarcative lengthening can be seen in (8i) too — the juxtaposition boundary is indicated by the final lengthening in *minyAAk* 'oil'. In (8h), the

pre-pause noun phrase *lisan tuh rih* ‘that caulking glue’ is the shared topic argument for the following statement, and the post-pause clauses *sanyapur umba minyAAk* ‘mixed with oil’ and *galapung nyahtong rih nyapur umba minyAAk* ‘the resin powder [we] mix it with oil’ in (8i) are the juxtaposed comments for that topic. In other words, the two clauses which convey new information are juxtaposed in (8i). On the other hand, in (8b–c), the clauses which convey information that is given (or accessible to the hearer) are juxtaposed. Therefore, lengthening in Kadorih is commonly observed in the cases involving hesitation and demarcation and it can be applied independently of information status of the units involved.

The final pause in (8h) can be seen as a juncture pause which demarcates the topic argument in (8h) from the comment parts in (8i). However, a certain hesitation may also be observed in the final pause in (8h) because of the semantically heavy content conveyed by the following comment parts. Generally speaking, hesitation pauses tend to be produced before a semantically heavy unit (Maclay and Osgood 1959). Thus, the functions of hesitation and juncture are not mutually exclusive, and a pause or lengthened segment may serve these two functions simultaneously.

2.4 Prosodic features and information flow in narratives

This subsection briefly considers the information flow by comparing prosodic features in folktale and non-folktale narratives.

In all kinds of narrative texts, pause and lengthening tend to be used more frequently in the earlier part of a text. These prosodic features which may be roughly associated with silence can signal that the speakers are relaxed and control their speech production, but they can also indicate that they are under pressure and feeling bewildered.

Fillers and hesitation pauses tend to be used more often in non-folktale texts. A folktale has fixed storyline and constructions. Therefore, what the narrator must do is to recall and produce those fixed structures, without any need to create new structures. If narrator’s memory and production skills are strong enough, fillers and hesitation pauses will not be much used. On the other hand, other kinds of stories usually require creating new sentences and gathering threads of a story. Non-folktale storytellers will need more time for these mental processes, so that they tend to use fillers and hesitation pause many times.

Interestingly, sentence-internal boundary markings realized by lengthening and pitch contour alone, namely without juncture pause, are observed more frequently in non-folktale texts. When we listen to a non-folktale text in Kadorih, we will feel that many sentences are structured in a somewhat random fashion. It can be said that non-folktale storytellers tend to be less concerned with aesthetic differences between demarcations obtained by means of pause, lengthening and pitch. On the other hand, folktale narrators tend to be more concerned with this difference and they may more consciously know some sort of predominance of pause over lengthening and pitch. This can be another reason why information flows in folktales are usually smoother than those in non-folktales.

2.5 The importance of pitch

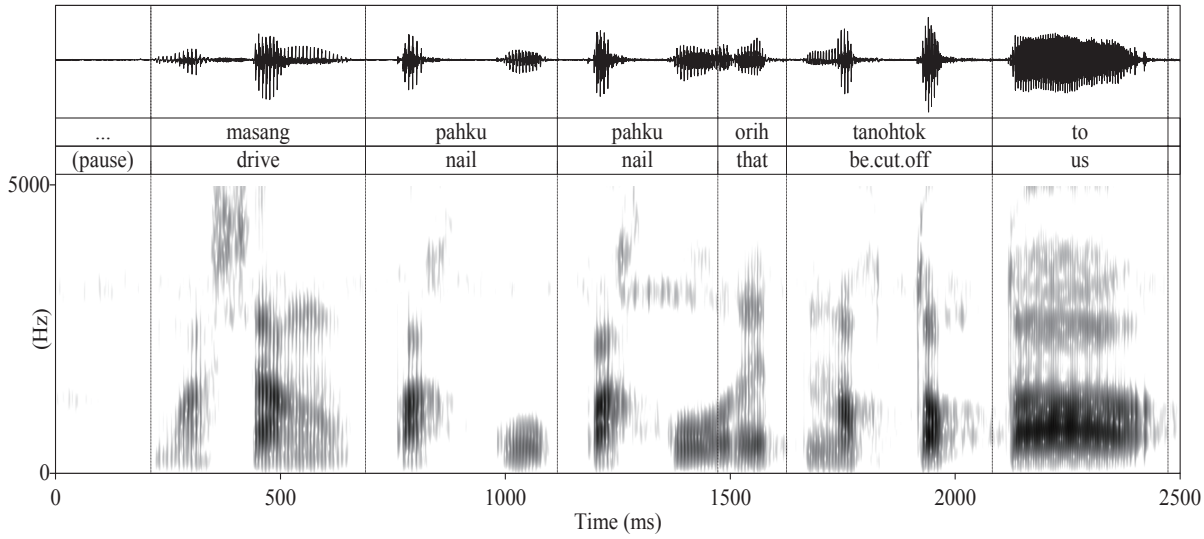
Non-folktale storytellers sometimes do not use either pause or lengthening to mark a boundary. When we listen to such non-paused and non-lengthened sequences, we will be a little bit confused. The extract shown in (10b) is a representative example.

(10) a. *harun to masang AAh …*
b. *masang pahku pahku orih tanohtok tOO …*
c. *tanohtok ngindou to kuhung ah rih …*
'Only after that we set it (=No.2 side plank) up …
drive nails that nails were cut off by us …
their heads were cut off and thrown away by us …'

In (10b), there are two clauses juxtaposed without any intervening pause or lengthened segment, *masang pahku* and *pahku orih tanohtok to*. In (10a), the storyteller states the preceding operation of boat-making, and begins to move on to the next topic, that is, the next operation in (10b), but in the middle, he suddenly jumps on to another relevant topic, that is, cutting off the nail heads. After lengthening the last vowel and pausing, he supplements the information about the nails in (10c).

The annotated waveform and spectrogram of (10b) is shown in (11).

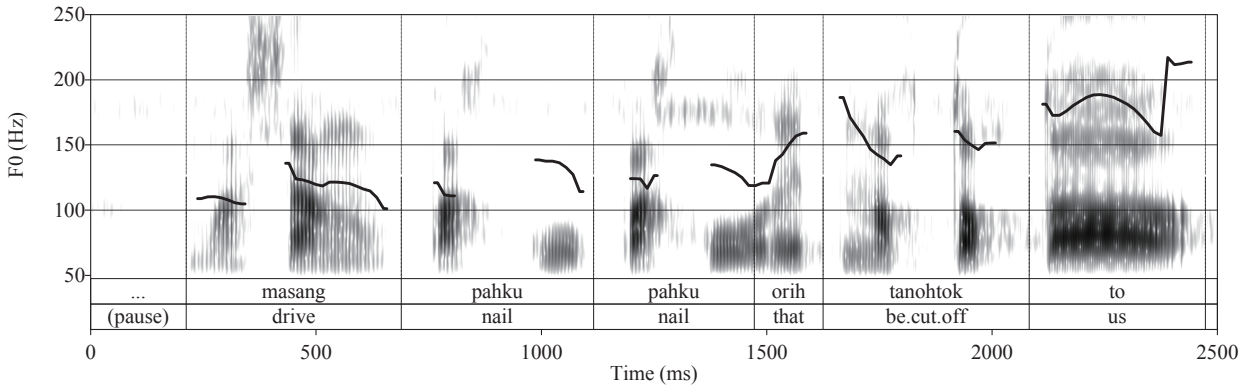
(11) Annotated waveform and spectrogram of (10b)



As can be seen in the figure in (11), there is no salient pause or lengthened segment between the first *pahku* part (around 1000ms) and the second *pahku* part. From the waveform or spectrogram, we can see a short gap between the end of the first *pahku* and the beginning of the second *pahku*. However, this gap is just the silent period for the occlusion of *p* in the second *pahku*. And it should be noted that the gap between *masang* and *pahku* (105ms) and that between *pahku* and *pahku* (100ms) are almost identical in duration. That is why we can perceive the sequence of words *"masang | pahku | pahku"* as pronounced at the same interval of time.

When we listen to the whole sequence in (10b), we can be strangely aware of the existence of the boundary between the first *pahku* and the second *pahku*. The acoustic cues to this perception is the pitch, specifically, falling pitch, rising pitch, and pitch uptrend (cf. Ladd et. al. 1985). The figure in (12) shows the acoustic correlates of these pitch contours.

(12) Annotated spectrogram with the F0 contour superimposed



The figure in (12) has the same range of the sequence as the one given in (11), and the fundamental frequency of the sequence is superimposed on the spectrogram. The first *pahku* is pronounced with a slight falling pitch at the end. The correlated F0 contour slightly drops from 138Hz to 114Hz. And, the following topic argument *pahku orih* is pronounced with a rising pitch at the end, which correlates to the sharp F0 movement observed on *orih*, rising from 120Hz to 186Hz. Moreover, the latter part of the sequence, *pahku orih tanohtok to* is produced with a gradual rise which can be compared with the former part. These pitch contours can contribute to our perception of the boundary between *pahku* and *pahku*. Both falling and rising pitch are the normal indicators of a clause boundary in Kadorih, and pitch uptrend signals that the uptrend part is different enough from the rest of the sequence.

When a listener keeps up with a relatively faster pace of information flow in Kadorih, the more important acoustic cue may be the fundamental frequency (pitch) although gap (pause) and duration (length) are important as well.

3. Information structure and prosody

This section discribes some useful prosodic features for understanding information structure of Kadorih, focusing mainly on pause.

3.1 Breathy pause

Relatively long pause beginning with a breath can be observed for all speakers of Kadorih. This pause can be called "breathy pause", as opposed to silent pause which does not involve a breath. In Kadorih, it is a prototypical pause after a discourse connective or conjunction, a topic argument, or a whole/quoted sentence. (13a) and (13b) show such breathy pause after a whole sentence, and (13c) shows a breathy pause after a conjunction. In (13d), the first pause occurs after the quoted sentence, and the second one occurs after the whole utterance. A breathy pause is indicated by a capital *H* plus three dots in each extract.

(13) a. *tahpII kihtai ohcin naang aro H...*
'But he saw there were many birds (breath) … (1077ms)'
b. *iyo UhkOO noon buwu ah aang taruk kacu H...*
'Then, Uhko set his fish trap on a tree (breath) …(2438ms)'
c. *inonko H...* (800ms) *ihco ondou atuh Uhko ngindoi ah ...*
'And then, (breath) … Uhko waited for it all day long'
d. *"dinun ohcin naang aro poh Uhko" H... hion Mulau H...*
' "Uhko! you got so many birds" (breath) …(759ms) said Mulau (breath) … (1916ms)'

As shown in (13), a breathy pause contributes to the demarcation between cohesive information which is manifested in sentences. On the other hand, a breathy pause often occurs after a topic argument in a sentence. In such a case, this kind of pause usually serves as post-topic marker. The whole extract in (14) can be grammatically analyzed as a sentence, which is preceded by a conjunction. (14a) shows a conjunction and a topic argument *Uhko*, which are followed by a breathy long pause. In (14b), there are three clauses, that is, (a) 'carried his fish trap', (b) 'went to a river', and (c) '(then) he set it'. None of them is separated by a pause. The prepositional phrase in (14c) supplements the information where Uhko set his fish trap, that is, in the river. Only between (14b) and (14c), a breathy short pause is used.

(14) a. *jadi UhkOO H...*
b. *nakung buwu oh nokuh ihco sungoi kalawui nooi H...*
c. *aang anan H...*
(One day, Uhko went setting his fish trap)
'So, Uhko (breath) … (982ms)
carried his fish trap went to a river and then he set it (breath) … (270ms)
there (breath) … (753ms)'

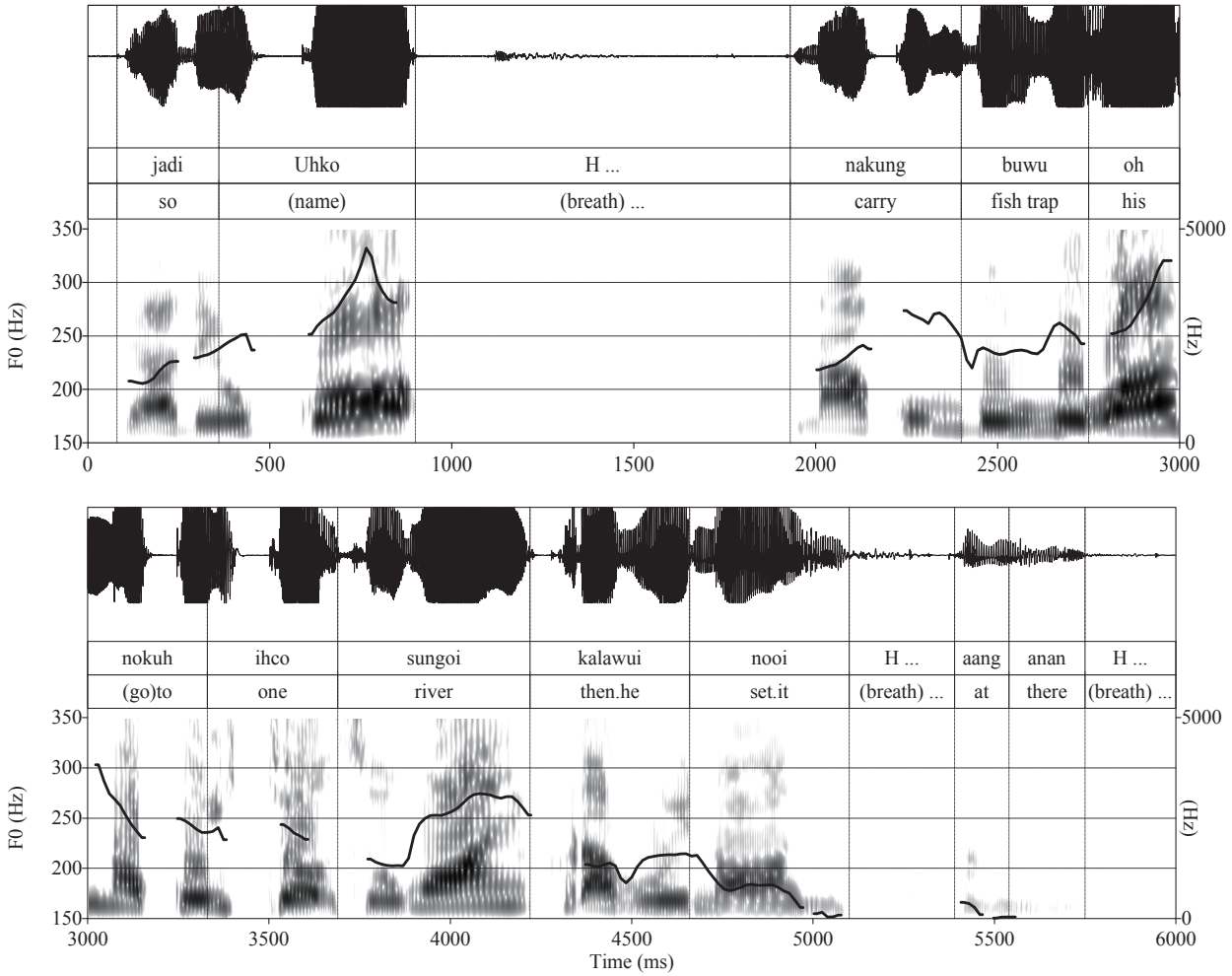
The sentence in (14) is a topic-comment construction which has multiple comments at the same time. In other words, the topic *Uhko* is shared by the three comments expressed by the clauses in (14b). The information structure of (14) can be represented schematically as in (15) with respect to its presupposition and assertion.

(15) Sentence: [[$_{TOP}$ *Uhko*] [$_{CMT}$ *nakung buwu oh*]
[$_{CMT}$ *nokuh ihco sungoi*]
[$_{CMT}$ *kalawui nooi aang anan*]]
Pragmatic presupposition: Uhko is a topic for comment x
Pragmatic assertion 1: x = carried Uhko's fish trap
Pragmatic assertion 2: x = went to a river
Pragmatic assertion 3: x = set Uhko's fish trap there (=in the river)

The extract in (14) was uttered after *inonko Uhko ondou atuh tulak, nyalan noon buwu ah* 'One day, Uhko went setting his fish trap'. At the time of the utterance, hearers already know that (a) there is Uhko's fish trap, (b) Uhko goes somewhere, and (c) Uhko has a purpose to set his fish trap. Thus, going and setting actions were already given information. However, both actions can be new information because there are newly established relations: the relation between the going action and the exact place where Uhko went, and the relation between setting action and the exact place where Uhko set his fish trap. In addition, at the time of utterance, either fish trap, going action, or setting action is not limited as a single issue. Accordingly, none of them has been available as a sufficient and salient presupposition for the following assertion. Therefore, none of the clauses can be regarded as an identificational construction like 'it was a river where Uhko went' or 'it was a river where Uhko set his fish trap'.

The three comment clauses in (14b) do not seem to be demarcated. There is no intervening pause or prominent lengthening. However, as we already observed in 2.5, perceptible pitch plays a role for dividing (14b) into three comment clauses. Its acoustic analysis is shown in (16).

(16) Annotated waveform and spectrogram of (14b)



We can find the first sharp rise in fundamental frequency, up to around 330Hz, in the column *Uhko*. The second, equally sharp rise can be found in the *oh* column at the very end of the upper figure. These two sharp rises have about 80Hz increase in F0. The last rise with such a large increase appears in the last syllable of *sungoi*, at around 4000ms. The first sharp rise is used for the topic argument *Uhko*, and the remaining two are main acoustic cues for demarcating the three comment clauses. In other words, the subsequent rising pitch may enable comment clauses to be easily linked to the foregoing topic even when the clauses are simply juxtaposed without any boundary pausing or lengthening.

From a grammatical point of view, the first two comments of the three, *nakung buwu oh* 'carry his fish trap' and *nokuh ihco sungoi* 'to a river' may be combined into a single clause through regarding *nokuh* as a preposition ('Uhko brought his fish trap *to* a river'). However, the verb *nakung* lexically means nothing more than 'carry something over one's shoulder' or just 'shoulder', so that it is inherently not a legitimate motion verb like *ngomin* 'bring'. Moreover, a translation of (14) into Indonesian given by a (bilingual) native speaker contained three independent clauses demarcated by two commas as in (17). Thus, it is more appropriate not to combine these two comment clauses.

(17) a. *Jadi Uhko memikul bubunya,* 'So Uhko carried his fish trap,
b. *berjalan menuju sebuah sungai,* walked toward a river,
c. *lalu memasang bubu di situ.* and set the fish trap there.'

The reason why the storyteller unnecessarily separates (14b) and (14c) by a pause may be as follows. This story will revolve around Uhko's strange behavior, setting a fish trap on a tree. Perhaps, the storyteller wanted to emphasize the key point where Uhko set his fish trap or emphasize that Uhko once did so in the right place, namely in a river.

3.2 Constrictive pause

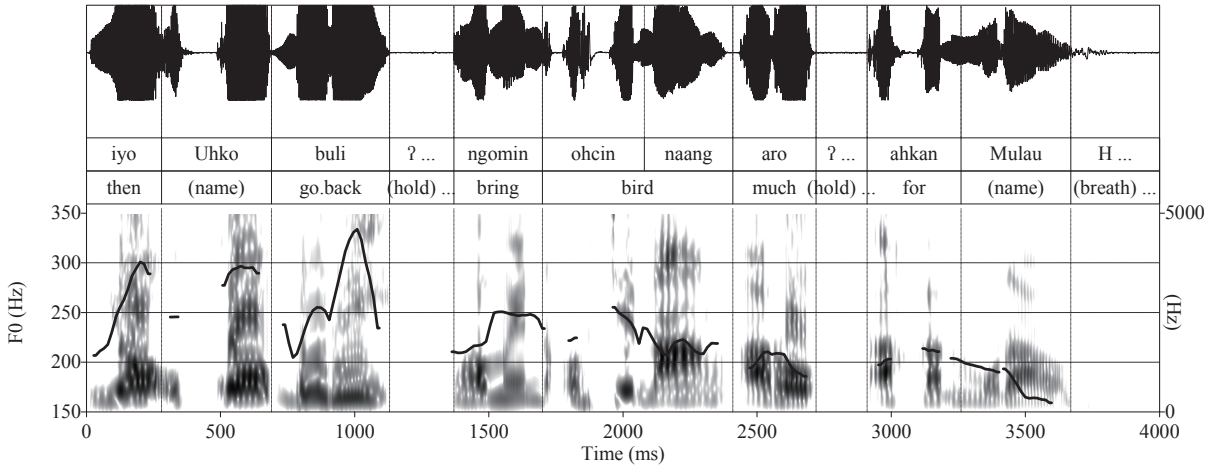
A short pause may be a useful signal of information structure as well. (18) shows a relatively short pause beginning with a glottal constriction (glottal stop or creaky voice). This kind of pause can be called "constrictive pause", and it can serve as a pre-focus marker. The whole extract in (18) contains two such pauses in a stretch of clauses.

(18) a. *iyo Uhko buli ʔ...*
b. *ngomin ohcin naang aro ʔ...*
c. *ahkan Mulau H...*
'Then, Uhko went back home (constriction) …(221ms)
brought many birds (constriction) … (189ms)
for Mulau (breath) … (1347ms)'

The whole example in (18) can be seen as a topic-comment construction which has two comments at the same time. The shared topic argument is again *Uhko*. The information structure of (18) is represented in (19) and the acoustic analysis of (18) is shown in (20).

(19) Sentence: [[$_{TOP}$ *Uhko*] [$_{CMT}$ *buli*]
[$_{CMT}$ *ngomin ohcin naang aro ahkan Mulau*]]
Pragmatic presupposition: Uhko is a topic for comment x
Pragmatic assertion 1: x = went back (home)
Pragmatic assertion 2: x = brought many birds for Mulau

(20) Annotated waveform and spectrogram of (18)



It can be said that a Kadorih storyteller uses a constrictive pause for a particular emphasis. After emphasizing the unlikely event of *(Uhko) ngomin ohcin naang aro* 'bringing many birds' in (18b) (although *Uhko* went setting his fish trap), the story progresses in a new direction. On the other hand, a new entity is also introduced by the prepositional phrase *ahkan Mulau*, who is Uhko's wife. The emphasis obtained by using constrictive pause helps addressees to figure out the new direction and new entity introduced here.

In addition to the constrictive pause, pitch and loudness may function as a means of emphasis. As can be seen from the sharp F0 movement of the first three words in (20), the frequency range of the first three words is greater than that of the remaining part, and the waveform and spectrogram of the first three words shows higher amplitude and darker or stronger intensity than that of the remaining part.

An extract in (21) shows another kind of emphasis. The quoted statements in (21) are uttered by Mulau although storyteller made slip of the tongue.

(21) a. *"[…] eam puji ulun noon buwu aang taruk kacu" hion Uhko ?...*
b. *"aang danum" ?...*
c. *aang sungoi" ?...*
' "[…] people have never set a fish trap on a tree" said [Mulau] (constriction) … (304ms)
"in water" (constriction) … (220ms)
in a river" (constriction) … (746ms)

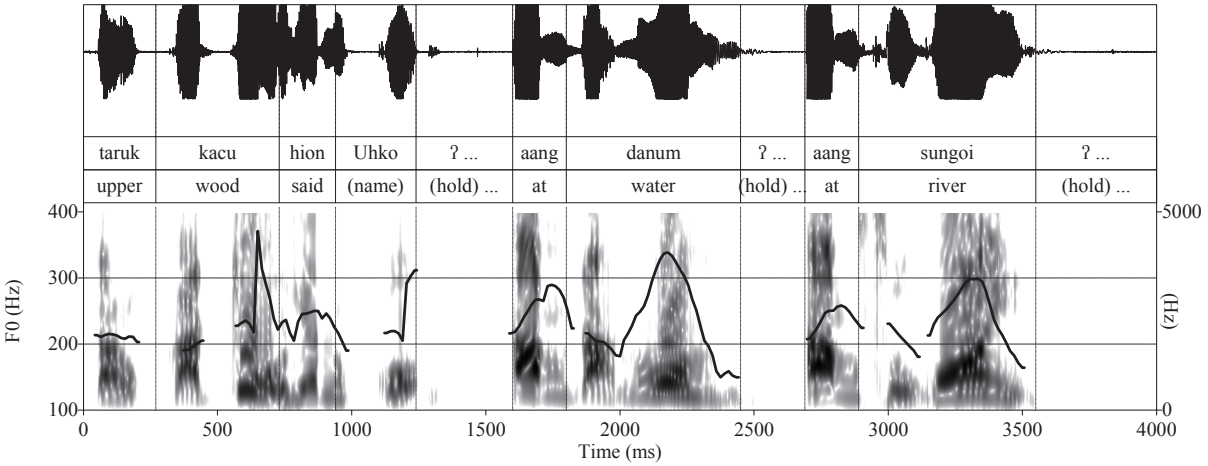
In (21a), Mulau shares general knowledge about setting a fish trap with the bird-brained Uhko. At this point, the proposition 'people set a fish trap not on a tree' becomes available for shaping a pragmatic presupposition. The information structure of (21bc) can be represented as in (22).

(22)

Sentence:	*aang danum, aang sungoi*
Pragmatic presupposition:	People set a fish trap (not on a tree but) in x
Pragmatic assertion 1:	x = water
Pragmatic assertion 2:	x = river

The pragmatic assertions expressed by (21b) and (21c) are identificational ones, that is, (21bc) identifies where people set a fish trap. The addressee, Uhko, once set his fish trap appropriately in a river as shown in (14c). Thus, we can guess that Uhko knows where to set a fish trap and that Mulau can guess so. However, Mulau emphasizes the place where a fish trap must be set in order to warn Uhko not to act crazy.

(23) Annotated waveform and spectrogram of (21)



In (23) as well, it can be recognized that pitch (and possibly loudness) play a role to signall the focus. Fundamental frequency sharply rises and falls in the columns of *danum* 'water' and *sungoi* 'river', which are places focused by Mulau.

4. Conclusion

In this paper, the distribution and behavior in discourse of pauses and lengthened segments has been analyzed from the viewpoint of acoustic phonetics. Pausing and lengthening in Kadorih express hesitation and demarcation. Basically, they are used independently of information status of the respective units. Additionally, I considered the difference between prosodic features in folktale and non-folktale narratives with respect to the information flow. In particular, relatively faster pace of information flow in non-folktales utterances usually requires the addressee to be more sensitive to the fundamental frequency (pitch) than to gap (pause) or duration (length). In section 3, I described two conspicuous pauses in Kadorih, namely breathy and constrictive pauses. A breathy pause can be used as a marker indicating the boundary between cohesive information or as a post-topic marker, and a constrictive pause can be used as a marker emphasizing the turning point of information flow in a discourse or as a pre-focus marker. In addition to these pauses, other prosodic features, such as pitch or loudness may play instrumental role signaling information flow, boundary or structure.

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