Word Order and Intonation in Indonesian[*]

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1   Introduction

While the syntactic and discourse roles of intonation have been widely studied for some Germanic and Romance languages, relatively little research has been done on intonational phenomena in the Austronesian language Indonesian, where intonation plays a fundamental role in many different contexts. It often conveys pragmatic (discourse) information as well as serving a syntactic function in certain situations.

This paper is an investigation of a particular case where intonation plays a role in Indonesian, where a distinction is conveyed both through rising and falling pitch and variations in word order. The phenomenon under consideration is the interaction of word order, intonation, and discourse context, including a description of the characteristic pitch contours associated with four possible orderings of topic, predicate, and subject.

The paper is organized as follows: Section 2 provides a description of the Indonesian language – the regions where it is spoken, its language family, dialects, and relevant grammatical structure. Section 3 introduces the patterns of the Indonesian stress system. Section 4 describes the methods employed in this investigation: information on speakers, equipment used, recording process, and evaluation of results. Finally, Section 5 gives the results of the phonetic analysis of the findings.

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2 The Indonesian language

Indonesian is a member of the Austronesian language family and of the Western Malayo-Polynesian subfamily. There are between 17 and 30 million native speakers[1] of Bahasa Indonesia (or Standard Indonesian), the official language of Indonesia. Bahasa Indonesia is a Malayan language, as are most of the local dialects (including Manadonese Malay, the local dialect spoken natively by the speakers consulted for this paper). The data elicited for this paper are in Standard Indonesian. Standard Indonesian is closely related to other varieties of Malay, such as Standard Malay and the various local dialects of Indonesian. Standard Indonesian is spoken as a first language in the capital city, Jakarta, as well as in many of the larger cities of Indonesia. It is also spoken throughout the country by educated speakers, including on the island of Sulawesi, where both speakers consulted for this paper are from and where the Manadonese Malay dialect is spoken.

The basic order of constituents in an Indonesian clause is subject-predicate-object for a transitive verb. For an intransitive verb, the basic order is simply subject-predicate. These word order facts will be especially relevant for the topic-subject-predicate ordering facts mentioned above.

The relevant structure for the various possible orderings of subject, predicate, and topic themselves is slightly more complicated. Of the two paradigms examined for intonational effects of topicalization, one is a wh-question and the other is a statement. For the wh-question, many orderings are possible, but the basic word order is:

(1)   [*Berapa*]   [*harga*]   [*rokok   ini*]
       predicate   subject   topic
       how.much   price   cigarette this
       'What is the price of this cigarette?'

The wh-word *berapa* is first, and corresponds to the predicate of the sentence, which is permissible in Indonesian.[2] *Harga* 'price' is the subject, and *rokok ini* 'this cigarette' serves as the topic of the sentence, which will be further elaborated in Section 5. Topic, subject, and predicate are the three relevant categories for the discussion that follows in that section.

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[1] Source: Ethnologue report for Indonesian, 2004.

[2] Note that this deviates from the basic subject-predicate word order given in (1a). According to Sneddon (1996), "if the question word is predicate it often precedes the subject," and this is the case for example (1). The question for this paper is not so much establishing the "basic" ordering of constituents as describing the intonational information that is necessary for each *possible* ordering, as well as looking at the syntactic questions raised by the topicalization data.

The other sentence that was recorded for both speakers involves a process known as "predicate nominalization" (Sneddon 1996: 302). Predicate nominalization sentences are derived from sentences like (2):

(2)   *Suami   saya sampai.*
        husband my   arrive
        'My husband arrives.'

The two steps involved in predicate nominalization are: 1) movement of the verb to a position before the subject, and 2) addition of the *–nya* suffix onto the verb. The resulting construction is an NP:

(3)   *sampai**nya**   suami   saya*
        arrival.3POSS husband   my
        'my husband's arrival'

This entire NP can then serve as the subject of another sentence, such as (4).

(4)   *Sampainya   suami   saya   jam   dua nanti.*
        arrival.3Poss husband   my   o'clock   2   soon
        'My husband's arrival will be at 2 o'clock.'

The subject NP in sentence (4) can be split, as will be shown in Section 5, into the bare subject, 'arrival,' and the topic, 'my husband.' Once again, it is the relative ordering of these three constituents – subject, predicate, and topic – that will be discussed.

3   Stress in Indonesian

In this section, the stress system of Indonesian is outlined, both at the word level (syllable stress) and at the sentence level (basic intonational facts as presented in Poedjosoedarmo 1986). This discussion of stress is relevant to the present investigation because the primary tools used in the analysis were pitch traces, and pitch (fundamental frequency) has been shown to be the main correlate of stress in Indonesian in several studies (Laksman 1989, 1994 and Halim 1981). Thus a stressed syllable within a polysyllabic word is likely to have a higher pitch than the syllables around it, and this needs to be taken into consideration when examining pitch traces. At the sentence level, Poedjosoedarmo's analysis of the characteristic intonational units of Indonesian will be evaluated to see if it accounts for the data collected for this paper.

The stress system of Indonesian has been fairly well documented, but the analysis presented in Cohn (1993) and Adisasmito-Smith & Cohn (1996) was chosen for this paper because it accounts for secondary stress as well.[3] The basic facts are presented in (5)[4]:

(5) ó   jám   'o'clock'
     óo   gúru   'teacher'
     oóo   berápa   'how much'
     òoóo   màhasíswa   'university student'

The chart in (5) shows that for polysyllabic words, primary stress falls on the penultimate syllable (in monosyllabic words, the lone vowel is the locus of primary stress). In words with more than three syllables, a secondary stress occurs on the initial syllable.[5]

Patterns can be observed at the sentential level as well. Stress typically falls at the end of each phrase within the sentence, "phrase" referring here to a set of words whose order cannot be changed. In other words, when the various orderings of topic, predicate, and subject are examined, each of those units is considered a phrase, and each of them should have some type of stress at the end.

Poedjosoedarmo (1986) classifies Indonesian intonational contours into three types: rising, rising-falling, and flat. She then associates each basic pitch contour with a type of informational unit: a rising intonation is classified as *anticipatory*, a rising-falling contour as *focal*, and a unit with relatively level pitch is termed *supplementary*. A sentence contains, minimally, one focal unit, and anticipatory and supplementary units may or may not be present. There may be more than one anticipatory and/or supplementary unit, but never more than one focal unit. Further, when anticipatory units are present, they must precede the focal unit, and supplementary units must follow it.

The focal unit of a sentence corresponds to what the speaker believes to be the most important element in the sentence. Anticipatory units are considered "relatively important," containing "information which is old or given in some respect, but whose relationship to the rest of the clause is not deducible from previous information given in the text" (Poedjosoedarmo 1986: 7). Finally, the information conveyed in a supplementary unit is relatively unimportant to the

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[3] This is not to say that secondary stress will be central to this paper; in fact, it will not play a role at all since the vast majority of words elicited for recording have only one, two, or three syllables (with only one four-syllable word and none longer than that). The goal, however, was to present the most *complete* analysis of stress in Indonesian, and that is why the above analysis was chosen.

[4] (5) is based on chart (1) from Adisasmito-Smith & Cohn (1996), but using words elicited for this study and only words of up to four syllables.

[5] For evidence that secondary stress does fall on the initial syllable and not, for example, on every second syllable moving right-to-left, see the articles cited in this section.

discourse. If this analysis holds true for the data elicited for this paper, it will help explain not only the intonational contours of the topicalization examples (and thus their information structure), but their syntactic structure as well.

4 Process

Two adult female speakers of Indonesian were recorded for this paper. Both are also native speakers of the Manado Malay local dialect, which is spoken in the northern part of the island of Sulawesi. Data were gathered in two ways: 1) Speaker A's native speaker judgments were elicited regarding two intonational contrasts that had been recorded by another native speaker of Indonesian; and 2) paradigms from both Speaker A and Speaker S were recorded for the intonational contrast to be examined.

Subjects were recorded directly onto a Dell PC, reading item-by-item from a word list and using a Labtec Verse 514 microphone. The recordings were then analyzed using PCQuirer phonetic analysis software, the main analysis tool being pitch traces. The tokens for recording were selected with the topic-subject-predicate variable word order intonational contrast in mind. The complete wordlist is included in the Appendix.

For the portion of the experiment where Speaker A's judgments were collected, previous recordings of a native speaker of Indonesian were played from a Dell PC using PCQuirer playback. Judgments were gathered regarding several previously recorded intonational contrasts.

For the portion of the experiment where the two speakers were recorded, tokens were selected with the intonational contrast in mind. Recordings were made of four possible orderings: TSP (topic-subject-predicate), TPS, PST, and SPT. These four orderings were recorded for Speaker S with two sentences: *Berapa harga rokok ini* 'How much does this cigarette cost?' and *Sampainya suami saya jam dua nanti* 'My husband's arrival will be at 2 o'clock.' Speaker A was recorded saying each of those two sentences with the four possible orderings, and she also produced a paradigm of her own for *Mulainya film baru itu jam tujuh nanti* 'That new movie starts at 7 o'clock' (or, more literally, 'The starting time of the film is 7 o'clock').

Both speakers were asked to describe a context in which they could imagine themselves using each word order for each sentence. For this part of the experiment, a third female speaker (Speaker K) was consulted as well regarding possible contexts for each word order.

Analysis of the topic-subject-predicate examples consisted of two phases: 1) examining pitch traces of the two speakers' pronunciation of each token and comparing them; and 2) evaluating the intonational contours with respect to Poedjosoedarmo's analysis of the three types of intonational unit in Indonesian.

5   Results

In this section, results are presented for the intonational phenomenon that was studied. For each phenomenon, information is given on Speaker A's intuitions regarding the previous recordings (where relevant), followed by the results of the recording process. Representative pitch traces are included to illustrate the findings. In the topic-predicate-subject word order section, Poedjosoedarmo's analysis of the intonational units of Indonesian is evaluated against the data.

5.1   Intonational contours of four possible orderings of topic, subject, and predicate

Indonesian has relatively free word order compared to English. Certain items must always stand in a particular order – for example, a possessor must always follow the noun being possessed – but these units may appear in several possible orders within a sentence. Four such orders are examined in this section, and the elements in question are subject, predicate, and topic. The four orders that are possible in Indonesian are predicate-subject-topic, subject-predicate-topic, topic-predicate-subject, and topic-subject-predicate. Each possible ordering of constituents is fixed with respect to a particular discourse context, and specific variations in pitch arise for the different orders as well.

The goal at hand is to discover what each possible ordering signifies: What does the speaker intend to convey through his or her choice of word order? Does each ordering of elements have a particular intonational contour? How can the various informational structures be accounted for? Finally, can the phonetic and information-structure facts for each ordering of elements be collapsed into a synthetic whole?

Judgments were collected from three speakers (A, S, and K) on the meanings conveyed by each possible word order. The distinctions among meanings are very fine, and there does seem to be slight variation in the ways native speakers interpret them. However, many things were consistent across speakers.

The first sentence translates (somewhat clumsily in English) as 'The price of this cigarette is how much?' and the first word order to be considered is predicate-subject-topic[6]:

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[6] *Berapa* is the predicate, *harganya* is the subject, and *rokok ini* is the topic; these will remain constant for all four possible orderings.

(6)   a.   [*Berapa*]   [*harganya*] [*rokok   ini*]*?*
          predicate   subject   topic
          how.much   price.its   cigarette this

Speaker A considers the PST ordering to be formal, even "frigid." She might use it with someone who speaks a different local dialect of Indonesian, but feels that it is a quite rare word order. For Speaker K, she would use this when she has only one item in mind: that cigarette.
        The second ordering is subject-predicate-topic (SPT):

(6)   b.   [*Harganya*] [*berapa*]   [*rokok ini*]*?*
          subject   predicate   topic

For Speaker S, this is an "unusual" word order, and she would not actually use it in conversation. Speaker K would use this if she had been pointing at various items, but at the time was pointing at this particular cigarette. For Speaker A, the focus of the SPT sentence was on the cigarette: someone who used that word order would have a particular cigarette in mind. Although the actual NP *rokok ini* is low in this ordering, the *–nya* at the end of *harganya* refers to it, and it is possible that when a *–nya* is in the first word in the sentence, it has the effect of focusing the entity to which it refers. Speaker A feels that this is a quite formal word order, though not as formal as the PST order.
        The third word order is TPS:

(6)   c.   [*Rokok ini*], [*berapa*]   [*harganya*]*?*
          topic   predicate   subject

Speaker A said that this is an informal word order, as well as a quite common one. She would have several options in front of her when using this word order. Speaker S would use this word order if she knew she wanted to buy the item, but first wanted to find out the price. For Speaker K, fronting the topic has the effect of reintroducing it into the conversation. So if she and the shopkeeper had discussed those cigarettes earlier, and then she brought them up again, she would use this order. Another possibility would be if she were asking for a clarification of the price.
        The final possible ordering is TSP:

(6)   d.   [*Rokok ini*], [*harganya*] [*berapa*]*?*
          topic   subject   predicate

Speaker A would use this in an informal context, focusing on a particular cigarette she wants to buy. This parallels her intuitions about the SPT order as well, so for

this speaker it appears that in a question containing a subject followed immediately by a predicate, there is a degree of specificity involved. For Speaker K, this word order would be used if she didn't hear the clerk the first time, or if she were surprised by the price.

The second paradigm that was recorded is based on the sentence given above in (4), which translates as 'My husband's arrival will be soon at 2:00.' With a PST word order, that sentence looks like (7a).[7]

(7)   a.   [*Jam   dua nanti*] [*sampainya*] [*suami saya*].
                      predicate   **subject**   **topic**
                      o'clock two soon   arrival.3POSS husband my

Speaker A feels that this word order is not especially common, which would make sense since the unmarked order would be subject-predicate. She feels that the time of his arrival is being focused; again, this is because the predicate has been fronted. Speaker K would use this to strongly focus the time of the arrival, for example to correct someone who had gotten the time wrong.

The second order is SPT:

(7)   b.   [*Sampainya*] [*jam dua nanti*] [*suami saya*].
                      subject   **predicate**   **topic**

Speaker A considers this a common word order; someone has asked what time her husband will arrive and she is responding. Speaker K's response was nearly identical, that this word order is an answer to the question "When is your husband coming?" For Speaker S, who could not generate a situation where she would use the SPT order of the *rokok* sentence, the SPT order was more acceptable for the *suami* sentence.

The third order is TPS:

(7)   c.   [*Suami saya*], [*jam dua nanti*] [*sampainya*].
                      topic   **predicate**   **subject**

For Speaker A, there is a strong emphasis on the topic, "my husband," and she said it may even serve as an assertion about their relationship. Speaker K thinks of the fronted topic as reintroducing the topic and also feels that there is an emphasis on the time of the arrival, which would be expected given the fronted predicate.

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[7] *Jam dua nanti* is the predicate, *sampainya* is the subject, and *suami saya* is the topic. See examples (4-5) for further discussion.

The final order is TSP:

(7)   d.   [*Suami saya*]*, *[*sampainya*] [*jam dua nanti*].
                topic   **subject**   **predicate**

Speakers A and S say that there is equal emphasis on "my husband" and the time of the arrival.[8]   For Speaker K, the fronted topic serves to reintroduce "my husband" into the discourse, and she would use this order if she were simply listing plans for the afternoon: "My husband, I'm picking him up at 2:00, and then we're going to the store, and then we're going home, etc."

Since native-speaker intuitions have been gathered and intonation contours analyzed for the four word orders of these two sentences, the analysis proposed in Poedjosoedarmo (1986) and discussed in Section 3 can be tested to see if it makes the correct predictions for the various word orders regarding which elements the speakers intended to be in focus. The key points of the analysis are as follows: the three types of intonational units in Indonesian are anticipatory (rising pitch), focal (rising-falling), and supplementary (flat). There is one and only one focal unit in each sentence, though more than one anticipatory and/or supplementary unit may be present. When present, anticipatory units precede the focal unit and supplementary units follow it. Finally, each type of unit reflects a differing degree of prominence: the focal unit is the most prominent constituent in the sentence, followed by any anticipatory units, with supplementary units contributing very little to the discourse.

The descriptions of intonational contours in Tables 1 and 2 below have been vastly simplified so they can be evaluated against Poedjosoedarmo's three types of intonational units. Those interested in seeing the pitch traces themselves may contact the author. Tables 1 and 2 are organized as follows: the leftmost column indicates the word order. Each speaker's column is divided into three sections, which correspond to the three constituents in the order indicated at left. So in the PST row of the *rokok* sentence, the first word describes the shape of *berapa*; the second, the shape of *harganya*; and the third, the shape of *rokok ini*.

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[8] Speaker A also produced a paradigm: *Film baru itu, mulainya jam tujuh nanti*, for which her intuitions show a similar pattern to those of the *suami saya* example.

Table 1: Pitch contours for (6) by word order and speaker

PST: [Berapa]$_P$ [harganya]$_S$ [rokok ini]$_T$?

	Speaker A			Speaker S		
PST	rising	rise-fall	flat	rise-fall	flat	flat
SPT	rising	rise-fall	flat	rising	rise-fall	flat
TPS	rising		rise-fall	rising	rise-fall	flat
TSP	rising	rising	rise-fall	rising	rise-fall	rise-fall

Table 2: Pitch contours for (7) by word order and speaker

PST: [Jam dua nanti]$_P$ [sampainya]$_S$ [suami saya]$_T$.

	Speaker A			Speaker S		
PST	rising	flat	flat	rising	flat	flat
SPT	rising	rise-fall	flat	rising	rise-fall	flat
TPS	rising	rise-fall	flat	rising	rise-fall	flat
TSP	rising	rise-fall	rise-fall	rising	rise-fall	flat

Examination of the above tables verifies certain elements of Poedjosoedarmo's analysis of the intonational units of Indonesian. Where anticipatory units are present, they always precede the focal unit. Where supplementary units are present, they always follow the focal unit. As for the "one and only one focal (rise-fall) unit" rule, it is obeyed in all but 4 cases: the PST order of (7) for both speakers has no rise-fall unit, the PST order of (6) has no rise-fall for Speaker S, and the TSP order of (7) seems to have two focal units for Speaker A. So the basic claims about the ordering of anticipatory, focal and supplementary units are, for the most part, confirmed by the data elicited for this study.

However, Poedjosoedarmo's analysis falls short in the characterization of the rise-fall unit as "focal" and the informational function this name entails. When native-speaker intuitions are integrated into Tables 1 and 2 (via putting the constituent in boldface that the speakers said was most prominent[9]), if

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[9] The underlined words indicate constituents to which the speakers assigned prominence, but to a lesser degree than the bolded words.

Poedjosoedarmo's analysis makes the correct predictions then the boldfaced segments should always correspond with the rise-fall contours, but that is simply not the case:

Table 3: Contours for (6) with bold type to indicate prominence

PST: [Berapa]$_P$ [harganya]$_S$ [rokok ini]$_T$?

	Speaker A			Speaker S		
PST	**rising**	rise-fall	flat	**rise-fall**	flat	flat
SPT	rising	rise-fall	**flat**	rising	rise-fall	flat
TPS	rising		rise-**fall**	rising	rise-fall	**flat**
TSP	**rising**	rising	rise-fall	**rising**	rise-fall	rise-fall

Table 4: Contours for (7) with bold type to indicate prominence

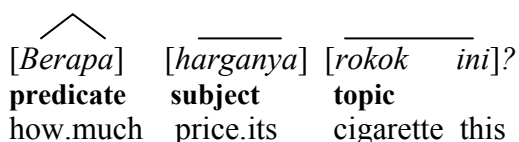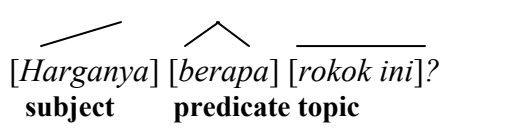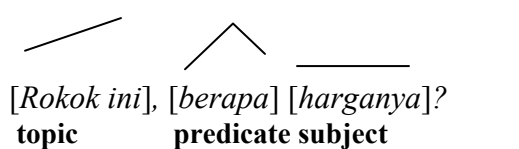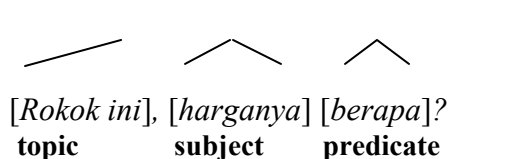PST: [Jam dua nanti]$_P$ [sampainya]$_S$ [suami saya]$_T$.

	Speaker A			Speaker S		
PST	**rising**	flat	flat	**rising**	flat	flat
SPT	**rising**	<u>rise-fall</u>	flat	**rising**	<u>rise-fall</u>	flat
TPS	**rising**	<u>rise-fall</u>	flat	**rising**	<u>rise-fall</u>	flat
TSP	**rising**	rise-fall	rise-fall	**rising**	rise-fall	flat

The segments to which the speakers assigned prominence in (6) are consistent across speakers,[10] but not as consistent with respect to the locus of prominence as (7). This is most likely due to the fact that (6) is a wh-question, thus causing complications not raised by (7), which is a statement.

Looking at Table 4, however, a distinct pattern emerges. The focal element is consistently, for both speakers, the first element in the sentence – *not* the element with the rise-fall intonation. For both the SPT and TPS orders, the two speakers assigned a secondary focus to the so-called "focal" element, which is exactly the reverse order of prominence predicted by the theory in question, where anticipatory units receive secondary prominence and focal units receive primary prominence. These facts indicate that the analysis proposed to account

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[10] With the noted exception of Speaker S's SPT sentence, which is the ordering she found unusual and for which she could imagine no possible context.
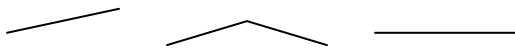
for the intonational (and informational) structure of Indonesian needs some adjusting. When each word order is written with a simplified graphical representation of the speakers' intonation, the status of certain elements becomes clear based on their syntactic, not semantic, function. Example (8) provides such a treatment of Speaker S's production of (6):
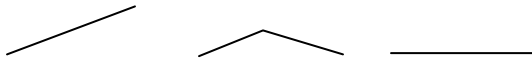
(8) a.   [*Berapa*]   [*harganya*]   [*rokok   ini*]?
          predicate   **subject**   **topic**
          how.much   price.its   cigarette this

     b.   [*Harganya*] [*berapa*] [*rokok ini*]?
          subject   **predicate topic**

     c.   [*Rokok ini*], [*berapa*] [*harganya*]?
          topic   **predicate subject**

     d.   [*Rokok ini*], [*harganya*] [*berapa*]?
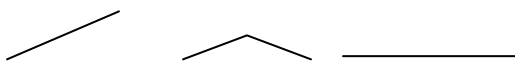   **topic**   **subject**   **predicate**

The important discovery made by examining the data as laid out in (8) is that Speaker S's intonation is such that, no matter which constituent is being focused and no matter what the word order, she always pronounces the predicate with a rising-falling intonation.[11] This indicates that for her, a rising-falling intonation is less an indicator of focus than of a constituent's syntactic function. Similar, but not quite identical, results are obtained when Speaker S's intonation is put above the possible word orders for sentence (7):

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[11] The picture is slightly more complicated for Speaker A: when *harganya* precedes *berapa*, it receives a rising-falling intonation; otherwise, *berapa* receives the rise-fall.

(9) a.   [*Jam   dua nanti*] [*sampainya*] [*suami   saya*].
            predicate   **subject**   **topic**
            o'clock two soon arrival.3Poss husband my

     b.   [*Sampainya*] [*jam dua nanti*] [*suami saya*].
            subject   **predicate**   **topic**

     c.   [*Suami saya*], [*jam dua nanti*] [*sampainya*].
            topic   **predicate**   **subject**

     d.   [*Suami saya*], [*sampainya*] [*jam dua nanti*].
            topic   **subject**   **predicate**

Speaker S's results, presented in (9), are identical to those in (8), except for the contour on the predicate of the TSP sentence. For the TSP order, Speaker S has a rising-falling intonation in the *rokok* sentence and a flat intonation in the *suami* sentence. Also, the first element systematically receives primary prominence, with a secondary prominence on the second element in the SPT and TPS orderings.

6   Conclusion

The effects of intonation on syntax and discourse are considerable, especially in a language such as Indonesian. In the case examined here, intonation is integrated with the structures of various word orders to convey discourse information. Future research on this topic may choose among many angles from which to explore the issue, whether via phonetic, syntactic, or discourse analysis.

Appendix: Word list

Topic-predicate-subject sentences

Rokok ini, harganya berapa?

Rokok ini, berapa harganya?

Berapa harganya rokok ini?

Harganya berapa rokok ini?

Suami saya, sampainya jam dua nanti.

Suami saya, jam dua nanti sampainya.

Jam dua nanti sampainya suami saya.

Sampainya jam dua nanti suami saya.

     and for Speaker A:

Film baru itu, mulainya jam tujuh nanti.

Film baru itu, jam tujuh nanti mulainya.

Jam tujuh nanti mulainya film baru itu.

Mulainya jam tujuh nanti film baru itu.

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