

# Prosodic vs morphological prominence in Japanese echo questions

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This paper presents new data from an elicitation experiment on the prosody of echo-questions (EQ) and question-echo-questions (QEQ) in Japanese, addressing the following questions.

- (i) How does prosody for EQ and QEQ differ from content question (CQ) prosody?
- (ii) How do morphosyntax and prosody interact in the expression of prominence?

Analysis of the data provides evidence that the prosodic feature *pitch range expansion* (PRE) proposed for Chinese by Peng et al. (2005) is also present in Japanese as a gradient feature, and that prosody and morphosyntax interact in expressing prominence.

## 1 Syntax of Japanese EQ and QEQ

EQ are those questions where the speaker is asking for clarification or confirmation of an utterance that they have just heard, repeating much of that utterance. Where this previous utterance is itself a question, the echo question is termed a QEQ.

In the English example dialogues (1-2), responses (1ii) and (2ii) are an EQ and a QEQ respectively, each marked by distinctive prosody, and with *wh*-in-situ word order in the EQ (1ii).

- (1) i. A: John chose a toy for Julie at the shop.  
ii. B: John chose a toy for Julie *where*?
- (2) i. A: Where did John choose a toy for Julie?  
ii. B: Where did John choose a toy for Julie? [At the shop.]

Japanese EQ repeat the utterance, replacing constituents with question words as necessary, and finally adding the particle *tte*, glossed here as 'EQ' (Hinds, 1986). Example dialogues (3-4) are the Japanese equivalents of (1-2), with (3ii) being an EQ in response to a declarative utterance, and (4ii) being a QEQ in response to a CQ.

- (3) i. Decl: *norio-ga mise-de mayumi-ni omocha-o erabimashita*  
Norio-NOM shop-LOC Mayumi-DAT toy-ACC chose.POL  
'Norio chose a toy for Mayumi at the shop'  
ii. EQ: *norio-ga doko-de mayumi-ni omocha-o erabimashita tte*  
Norio-NOM where-LOC Mayumi-DAT toy-ACC chose.POL EQ  
'Norio chose a toy for Mayumi *where*?'

- (4) i. CQ: *norio-ga doko-de mayumi-ni omocha-o erabimashita (ka)*  
 Norio-NOM where-LOC Mayumi-DAT toy-ACC chose.POL (Q)  
 'Where did Norio chose a toy for Mayumi?'
- ii. QEQ: *norio-ga doko-de mayumi-ni omocha-o erabimashita ka tte*  
 Norio-NOM where-LOC Mayumi-DAT toy-ACC chose.POL Q EQ  
 'Where did Norio chose a toy for Mayumi?' [At the shop.]

CQ in Japanese have their content questions word(s) in-situ, and this word order does not change for EQ and QEQ. In a CQ, the utterance-final question particle *ka* is optional. EQ and QEQ require the particle *tte*, and when a CQ is echoed as a QEQ, the CQ question particle *ka* cannot be omitted before the final particle *tte* 'EQ'.

## 2 Japanese prosody

The vast majority of Japanese words carry lexical pitch accent (Vance, 2008). The Japanese prosodic hierarchy includes intonational phrases (IP), each of which comprises one or more accentual phrases (AP). An AP is often only one word plus associated particles, but may be longer if one word does not have a pitch accent. Within an AP, F0 rises to a high tone H, with a sharp fall at the site of the pitch accent and then a further fall to a low tone L at the right phrase boundary. Across an IP, the height of the H tone in its APs falls with declination (catathesis), but this can be modulated by pitch range expansion/compression (PRE/PRC).

Figure 1 shows the prosody associated with the declarative utterance (5). Declination across the utterance is clearly visible. Declarative utterances are characterised by a period of 'final lowering' (Pierrehumbert and Beckman, 1988), described by Venditti (2005) as a prominent H tone followed by a period of pitch range compression, which results in a low plateau. This prominent H tone is visible at *omocha-o* 'toy-ACC' in Figure 1. Note that the pitch of this H tone is slightly above the H of the previous word *mayumi-ni* 'Mayumi-DAT' but still lower than the H tones of the APs at the start of the utterance.

- (5) *norio-ga mise-de mayumi-ni omocha-o erabimashita*  
 Norio-NOM shop-LOC Mayumi-DAT toy-ACC chose.POL  
 'Norio chose a toy for Mayumi at the shop?'

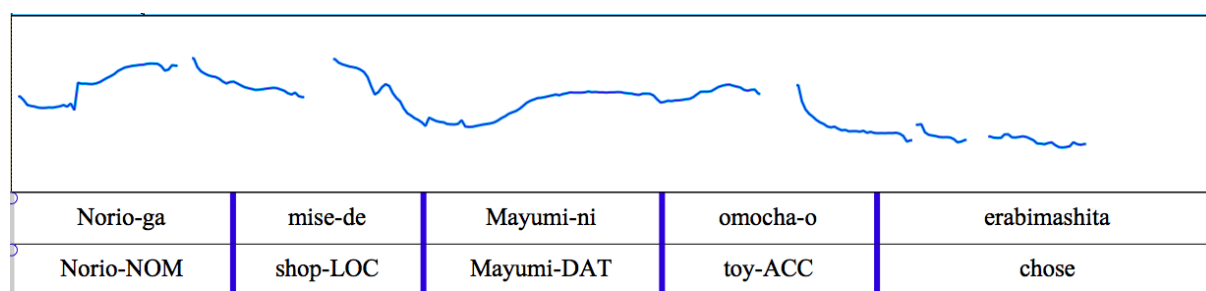


Figure 1: Pitch variations in an example Japanese declarative utterance

Content questions (CQ) have distinctive prosody, as shown in Figure 2, which refers to example (6).

- (6) *norio-ga mise-de dare-ni omocha-o erabimashita ka*  
 Norio-NOM shop-LOC who-DAT toy-ACC chose.POL Q  
 'Who did Norio choose a toy for at the shop?'

Question focus is marked by PRE at the question word followed by PRC for the remainder of the utterance. Whether or not the question particle *ka* is present, there is an utterance-final LH tune that also occurs with PRE (Hirovani, 2003). In Figure 2, the H tone at *dare-ni* ‘where-LOC’ is also the highest pitch within the utterance, above pitch the H tones of the two previous words which show a pattern of declination similar to the declarative utterance in Figure 1. The LH tune on the question particle *ka* is also clearly visible.

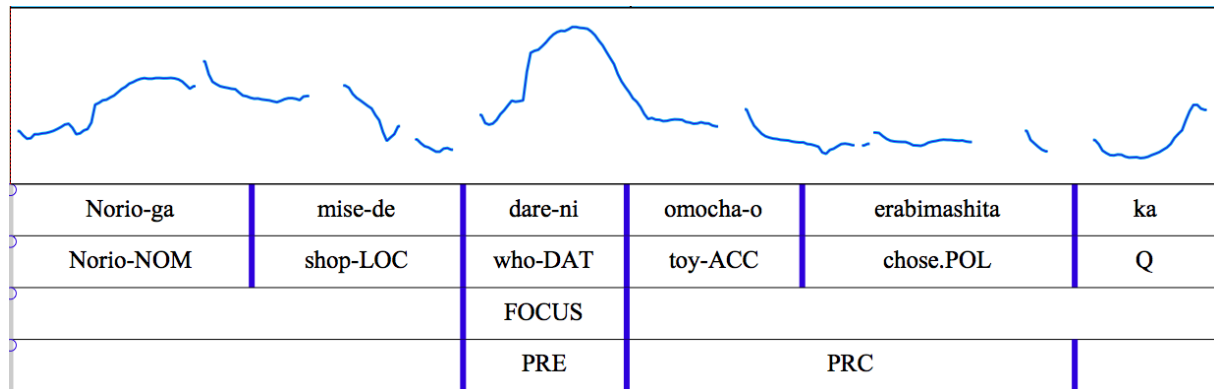


Figure 2: Pitch variations in an example Japanese content question

The specific prosody of EQ and QEQ is less well understood. This study collected data on the two question types and compared it with CQ prosody for otherwise similar utterances.

### 3 Method

Examples of spoken Japanese were elicited at three non-consecutive recording sessions, each consisting of shorter sub-sessions. Recordings were made in a soundproof room at the Language and Brain Laboratory at the University of Oxford. The consultants were four female native speakers of Japanese from the Tokyo area.

Written instructions in the target language, displayed on a monitor, were given to consultants before each session began asking them to read aloud the sentences they would see onscreen fluently and as naturally as possible. The stimuli were single sentences and two- or three-sentence mini-dialogues, comprising questions and answers, presented in pseudo-randomised order. Single sentences in isolation were recorded by each consultant individually, while dialogues were recorded by two consultants at a separate sub-session.

Utterances were segmented manually, and  $F_0$  maximum, minimum and pitch span (Hz) were calculated for each word. For each speaker, the data were normalized by calculating the mean pitch span across the first word of all utterances and settings.

### 4 Findings

The figures below present the variations in pitch span ratio during an utterance for a CQ without the question particle *ka*, a CQ with *ka*, an EQ, and a QEQ. Figures 3, 4, 5, and 6 show these variations for questions with different focused constituents, being the subject, object, indirect object, and locative adjunct respectively.

In each graph, the PRE at the focused constituent is clearly visible, followed by PRC until the final word/particle of the utterance. There is little variation in the level of PRE between the question types in each figure.

With one exception, the level of PRE at the end of the utterances shows consistent patterns of variation between question types, across all four focus constituents.

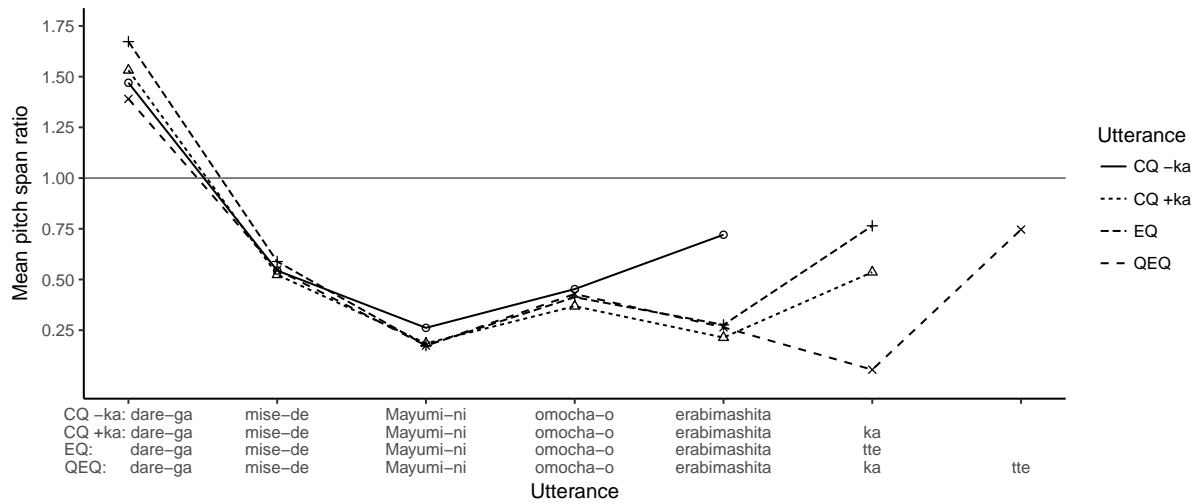


Figure 3: Comparison of CQ ± ka, EQ, QEQ: focus constituent is *dare-ga* 'who-NOM'

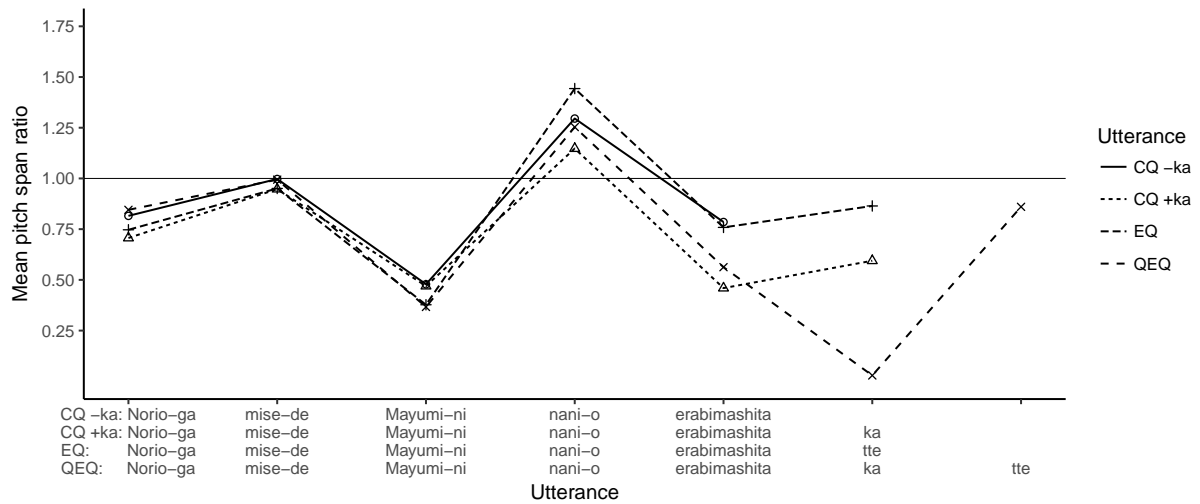


Figure 4: Comparison of CQ ± ka, EQ, QEQ: focus constituent is *nani-o* 'what-OBJ'

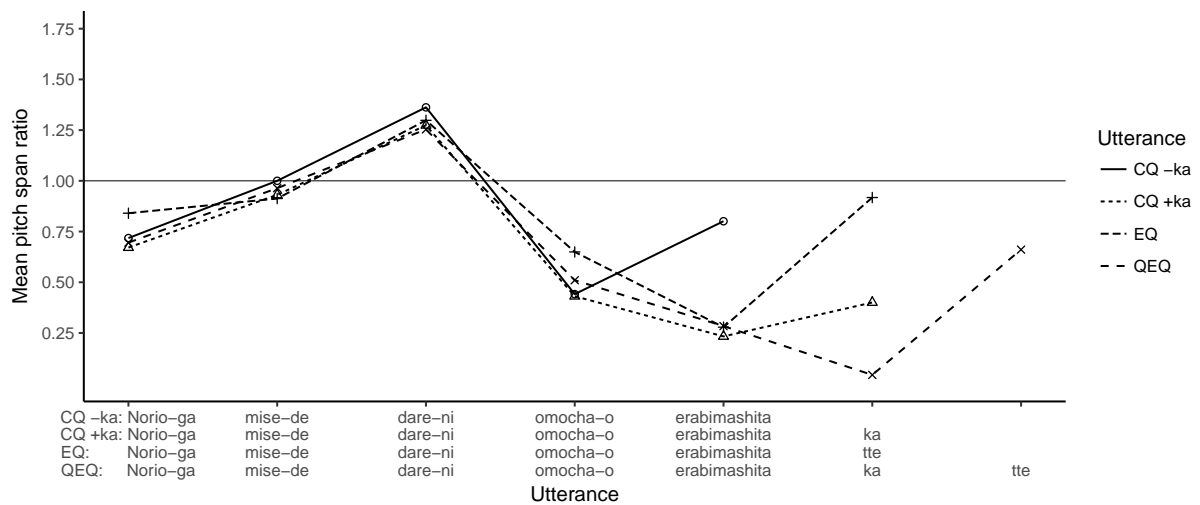


Figure 5: Comparison of CQ ± ka, EQ, QEQ: focus constituent is *dare-ni* 'who-DAT'

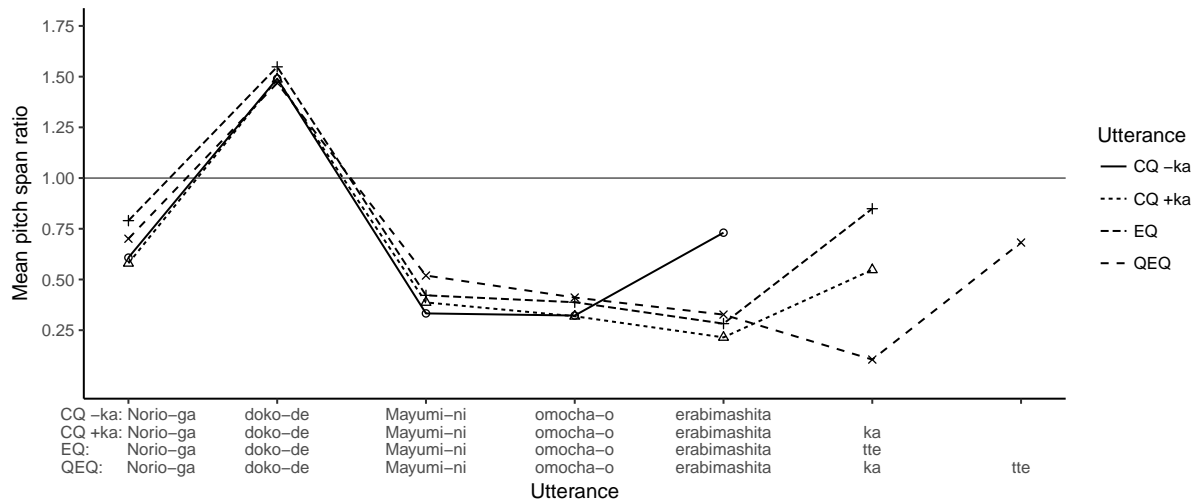


Figure 6: Comparison of CQ  $\pm$  *ka*, EQ, QEQ: focus constituent is *doko-de* ‘where-LOC’

All question types show an increase in final PRE compared to the previous period of PRC. However, there are consistent variations. For the two types of CQ, PRE without the question particle *ka* is greater than PRE with the question particle *ka*. The exception to this is *nani-o* which may be explained by an interaction between post-focus PRC and the PRE linked to the final LH tune.

Where there is a sentence-final particle, PRE for the echo-question particle *tte* is consistently higher than PRE for the question particle *ka*. There is no consistent difference between EQ and QEQ for the level of PRE for the particle *tte*.

## 5 Discussion

PRE appears to be a gradient phenomenon, allowing for different levels of markedness or prominence. Thus questions might be seen as more prominent than declarative utterances, and within the overall class of questions, EQ and QEQ are relatively more prominent than CQs. However, it does not appear to be utterance type alone that governs the level of PRE: there seems also to be a relationship between morphosyntax and prosody, such that more explicit morphosyntax occurs with lower levels of PRE. This aspect of PRE could benefit from further exploration.

If PRE is a gradient phenomenon, it is unclear how to describe it theoretically. Ascribing it to an H tone alone is insufficient, but a binary  $\pm$ PRE distinction, inherent in the proposed feature for Mandarin (Peng et al., 2005) also does not capture the gradient variation observed.

The data also lend weight to the argument that LH interrogative tune is a property of an interrogative utterance, rather than a tone-pattern lexically associated with the question particle *ka*. For a CQ without *ka*, it could be argued that the presence of the tune reflects an unexpressed, covert *ka*. However, in a QEQ where both *ka* and *tte* are present, there is no indication of any tone associated with *ka*: indeed these data points show the lowest levels of PRE across all of the utterance types. This is problematic for an account that assumes a covert *ka* where none appears. Treating the tune as a reflex of the semantics of the utterance, similar to the IP level tunes observed in Korean (Jun, 2005), provides a more parsimonious account.

## 6 Conclusion

Gradient PRE appears to be present in Japanese, providing an auditory correlate of semantic prominence for question focus and utterance type. EQ and QEQ prosody differs from CQ prosody in the size of question-final PRE. For CQs, the presence or absence of an explicit morphosyntactic question marker has an impact on the level of PRE. Further investigation is required to identify other utterance types where PRE is observed, and to develop a fuller account of factors affecting gradience.

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