

# Similarities and Differences in the Development of Sounds “s” and “sh” in English and Japanese

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## INTRODUCTION

### Issues in speech sound development

#### 1. Are there language-universal tendencies?

- Early diary studies & reviews of case studies suggest that, e.g., stops emerge before fricatives in all languages (e.g., Jakobson, 1941).
- Some instrumental studies suggest that, e.g., vowels sounds that are frequent in ambient language occur more often in babbling (Boysson-Bardies, et al. 1989).

#### 2. Is emergence instantaneous and discrete?

- Diary studies suggest that individual speech sounds emerge in a discrete manner?
- Would more continuous measures show that adult-like competence emerges only gradually as children fine tune their articulations?

### Comparison of methods

#### 1. Transcription

- necessarily discrete,
- subject to language-specific phonological bias.

#### 2. Acoustic measures

- detailed and objective,
- needs a framework for interpretation.

### The current study

#### 1. Shared sounds in English and Japanese

- English: “s” (e.g. *seat*), “sh” (e.g. *sheep*)
- Japanese: “s” (e.g. *sakana*), “sh” (e.g. *shawa:*)
- Documented in studies using transcription.

#### 2. Opposite error patterns

- English: “s” acquired earlier than “sh”.
- Japanese: “sh” acquired earlier than “s”.

## PURPOSES

1. To identify developmental similarities and differences in the acquisition of “s” and “sh” in English and Japanese.
2. To determine whether the opposite error patterns reported in previous studies are artefacts of language-specific biases introduced during the transcription process.
3. To determine whether the process of sound development is gradual or discrete.

## METHODS

### Participants

1. 40 English-speaking and 40 Japanese-speaking children aged 2 to 5.
2. 10 English-speaking and 10 Japanese-speaking adults.

### Task & Sample materials

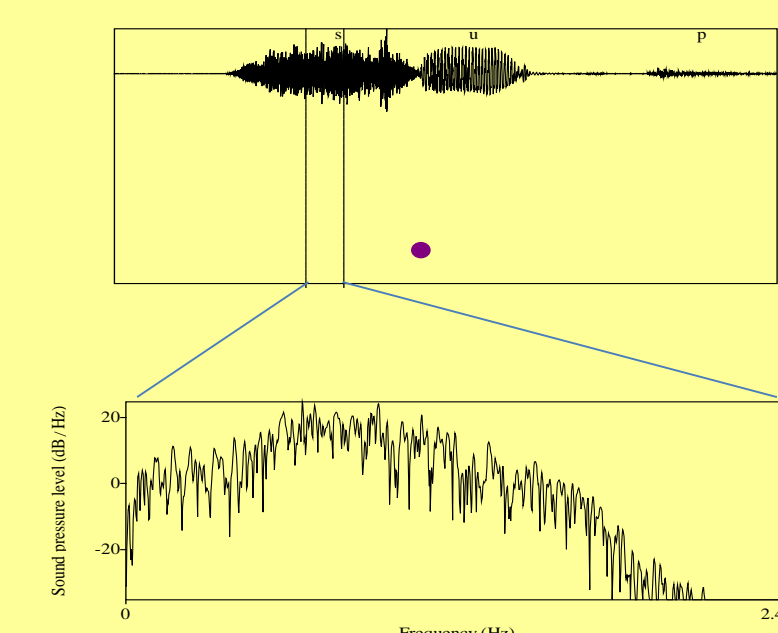
- word-repetition task.
- Stimuli: words beginning with fricatives and vowels.



Fricative	vowel	English	Japanese
s	A	soccer	/sarʊ/
	O	soda	/sora/
	U	soup	/suna/
sh	A	shop	/ʃawa:/
	O	show	/ʃo:ju/
	U	shoe	/ʃu:mai/

### Acoustic parameters

- **M1**: mean spectral frequency of the middle 40-ms frication slice.
- **M2**: Standard deviation of the spectral frequencies around M1.
- **onset F2**: F2 frequency taken at the onset of the following vowel.



## RESULTS

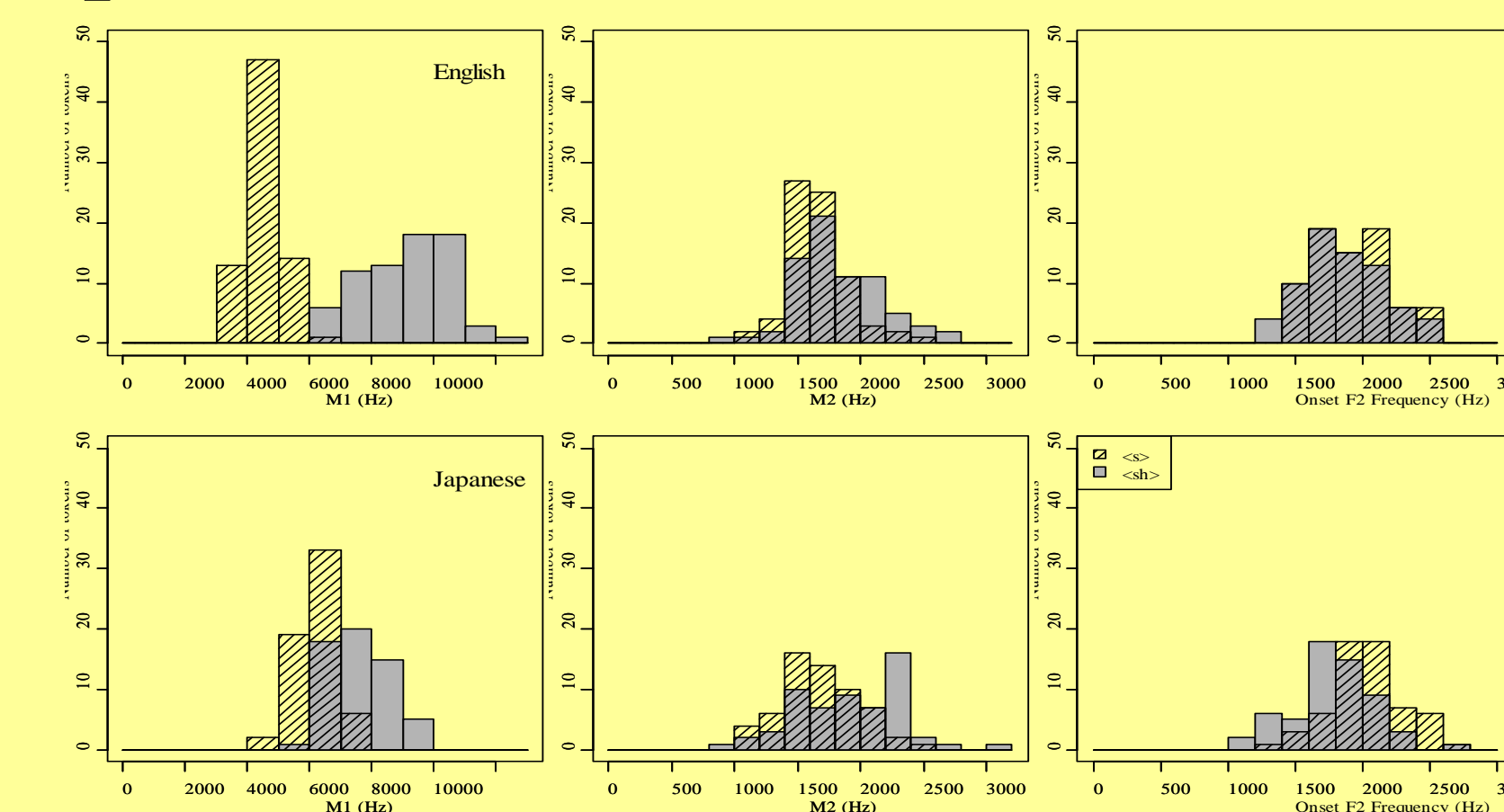
### Adult speech patterns

#### 1. English:

- ✓ M1
- ∅M2
- ∅Onset F2

#### 2. Japanese:

- ✓ M1
- ✓ M2
- ✓ Onset F2



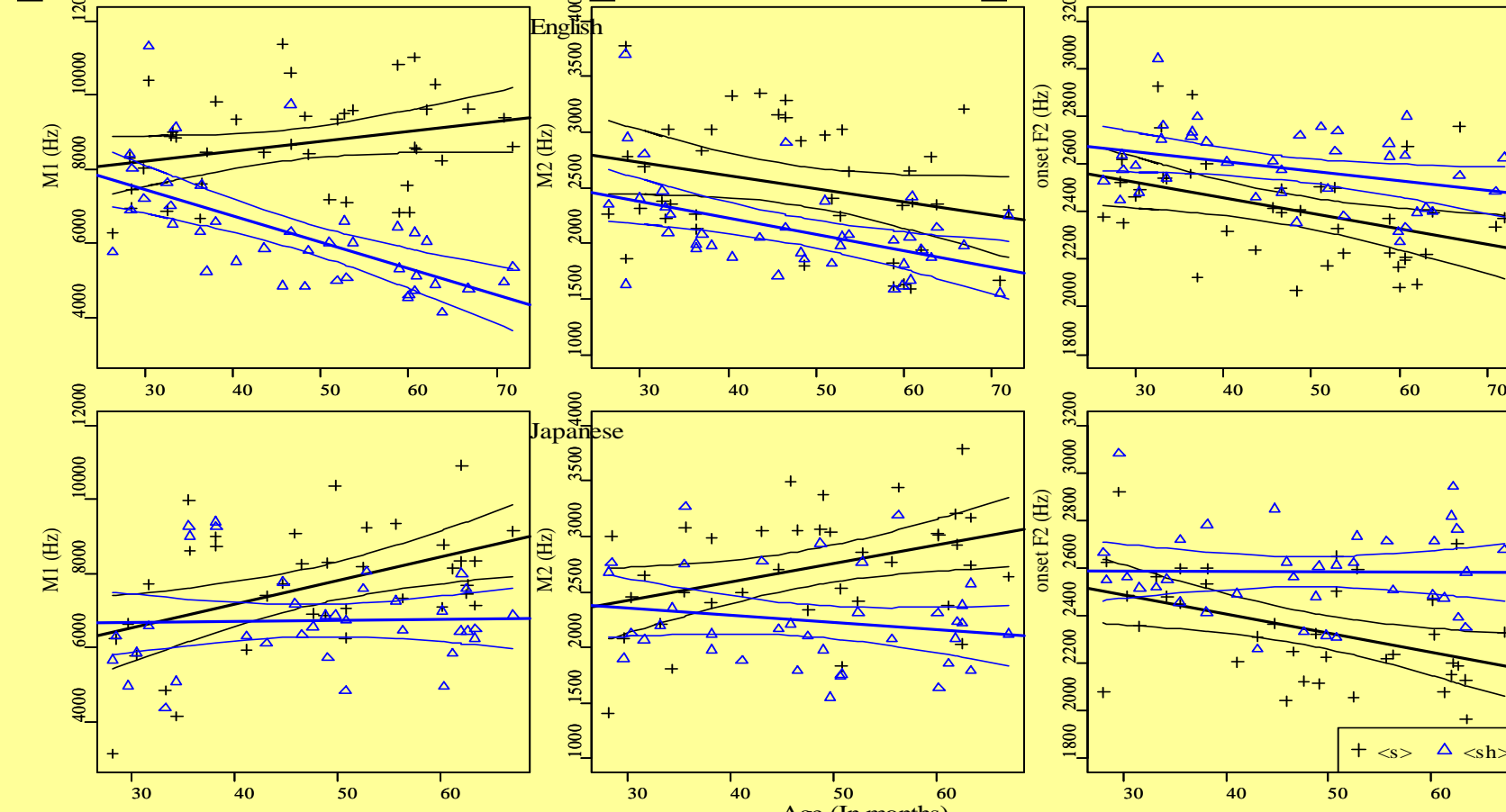
### Children’s speech developmental patterns

#### 1. English:

- ✓ M1
- ∅M2
- ∅Onset F2

#### 2. Japanese:

- ✓ M1
- ✓ M2
- ✓ Onset F2



## DISCUSSION

1. Developmental similarities: change from earlier undifferentiated form to separate categories.
2. Developmental differences:
  - Differentiation only occurs in the defining acoustic dimensions, specific to each language.
  - Earlier form is “s”-like in EN, but “sh”-like in JP.
3. Support the gradient view of speech acquisition.

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