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**The Hybrid System of Voice Onset Time
in French/English Bilinguals**

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Introduction

Given the differences in the systems of Voice Onset Time between French and English, does a speaker acquire a native-like Voice Onset Time in their second language or does their first language have an influence?

Methodology

- Eight bilingual speakers – 4 Native French and 4 Native English
- 2 paragraphs – one beginning in English and ending in French and one beginning in French and ending in English
- Each paragraph read 4 times
- Participants did not have the influence of other languages.

Participants

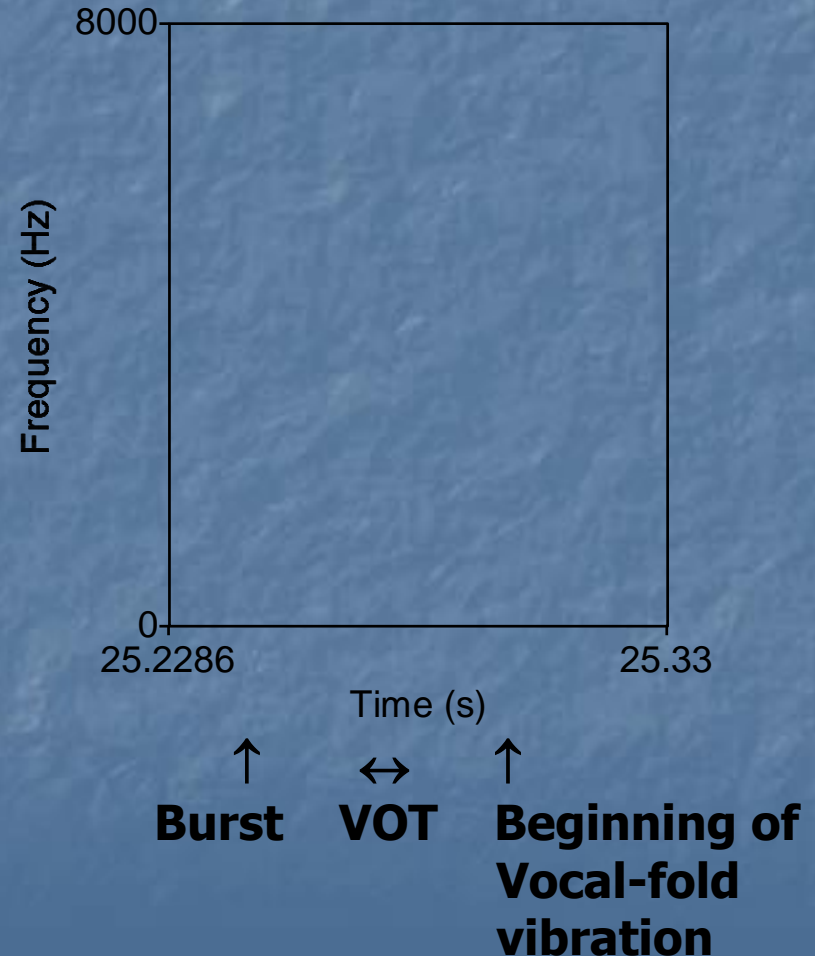
Participant Number	Gender	First Language	Second Language
1	Female	French	English
2	Female	French	English
3	Female	English	French
4	Female	English	French
5	Male	French	English
6	Male	French	English
7	Male	English	French
8	Male	English	French

Recordings

- Controlled Environment
- Sony MiniDisk Walkman
- Sony ECM-MS907 Microphone
- Sound Booth
- Analysed using Praat

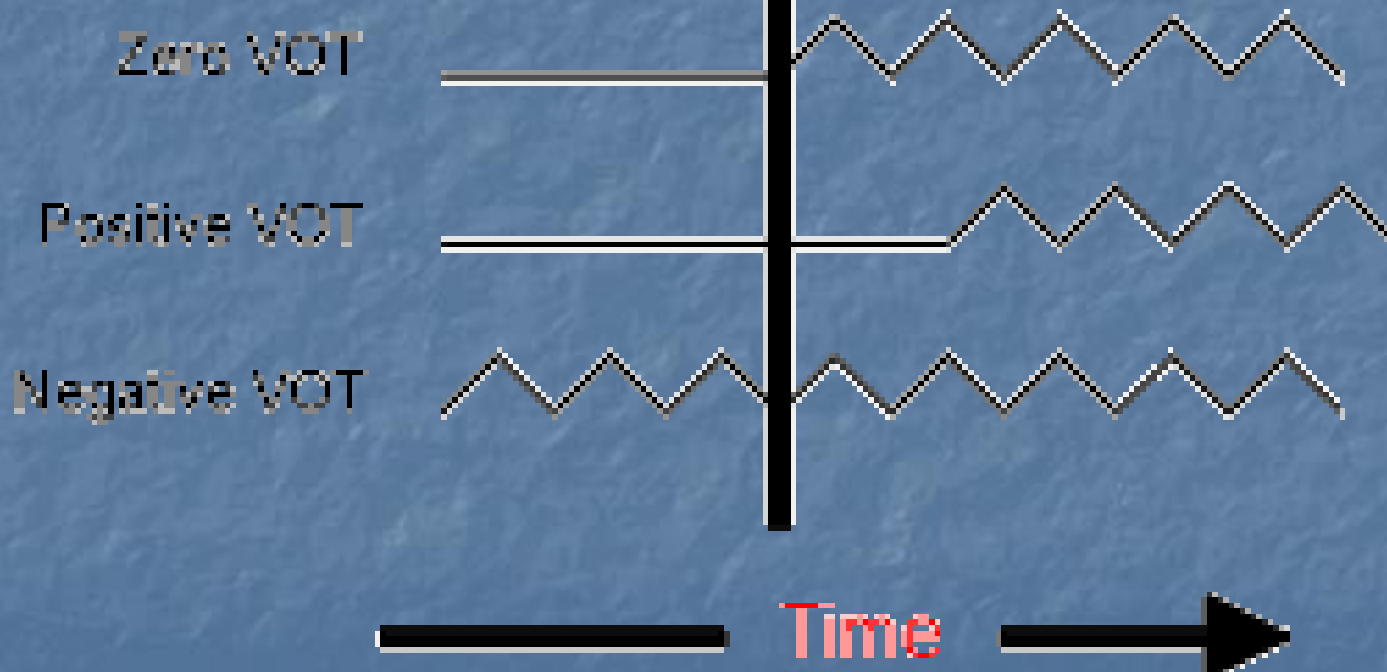
Background

- Voice Onset Time (VOT): 'The interval between the release of a stop consonant occlusion and the onset of the vocal-fold vibration' and is measured 'from acoustic displays as the time between the release burst and the first quasi-periodicity in the acoustic signal'. (Keating, 1984)



Voice Onset Time

Plosive release



VOT – Language Specific

- The VOT of stop consonants [p b t d k g] differs between languages
- 'Plus/minus values of the voicing feature will have different quantitative VOT values in different languages.' (Keating, 1984)
- Eg. [p] in French has a VOT similar to a [b] in English

Language	Voiceless Plosives	Voiced Plosives
English	Positive VOT	Zero VOT
French	Zero VOT	Negative VOT

VOT and Language Learning

- Does a person who learns a second language acquire a native-like VOT in their second language or does their native language have an influence?
- Does a person have a consistent VOT across languages regardless of differences between the two languages?

Analysis

- Only intervocalic stops were analysed to eliminate the differences due to aspirated or unreleased stops
- We found minimal variation between the languages in each of the paragraphs ie. English of the first paragraph and English of the second paragraph
- Mean and standard deviation calculated based on the language of use rather than its position in relation to the other language

Paragraphs

Paragraph A

Il était un fois une étudiante qui s'appellait Apolline. Comme d'habitude, elle devait faire ses devoirs avant de regarder la télé. Cependant, c'était à l'époque avant des ordinateurs et elle n'était pas une étudiante exceptionnelle. Apolline avait acheté beaucoup de papier pour faire ses devoirs en mathématiques. Mais beaucoup de ce papier était jetée à la poubelle. All addition had to be done on an abacus. Because she wanted a reputation as a good student, she couldn't sabotage herself by watching videos instead of doing her regular repetitions of elaborate addition questions. In order for Apolline to attain accolades in math she had to loose her baggage about addition.

Translation of French section

Once upon a time there was a student named Apolline. As always, she had to do her homework before watching tv. However, this was an era before computers and she was not a star in school. Apolline had to buy lots of paper in order to do her homework in math. But the majority of this paper ended up in the garbage can.

Paragraphs

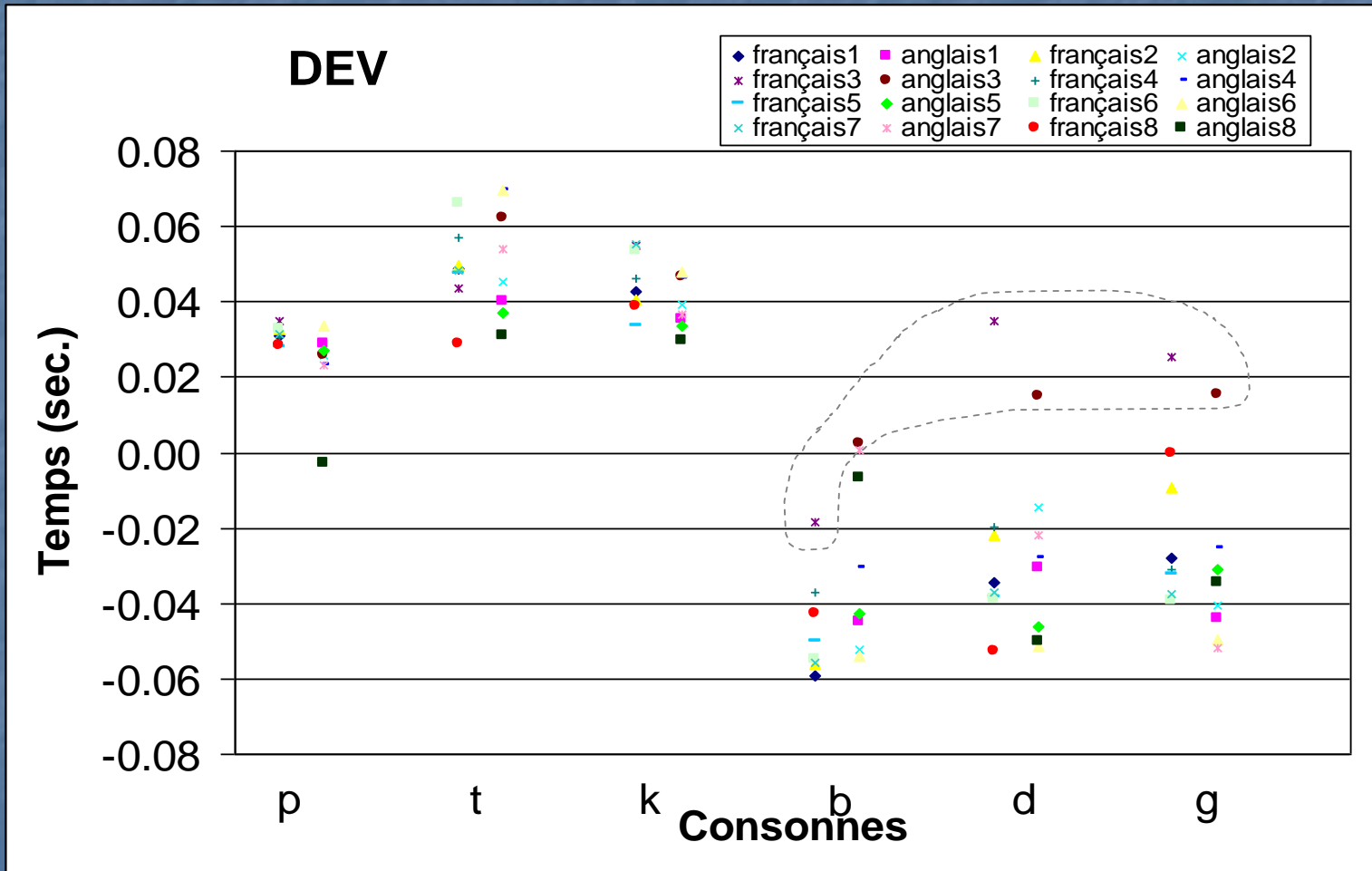
Paragraph B

Students of French want ways to attain fluency in spoken language. Repetition is necessary to strengthen the elaborate facial muscles necessary to form the individual sounds of the language. Aussi, comme d'habitude, les étudiants doivent beaucoup écouter la radio et regarder les épisodes en français. Si on répète des choses comme des idiomes, on apprendra plus de vocabulaire. Il est aussi nécessaire d'habiter dans un environnement français. Si les étudiants écoutent ces conseils, ils dépasseront leurs attentes.

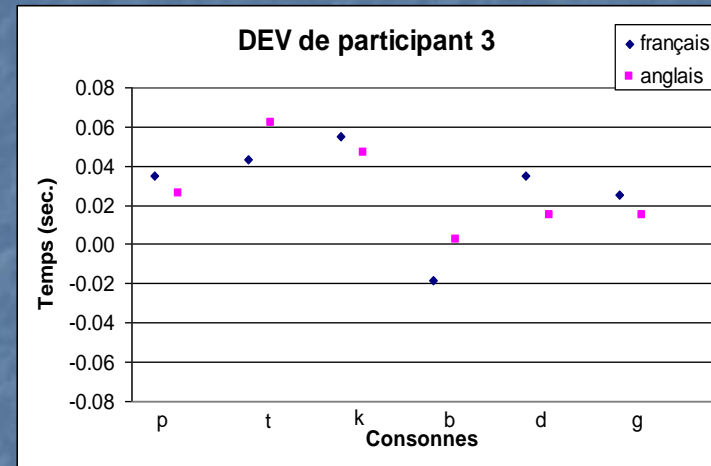
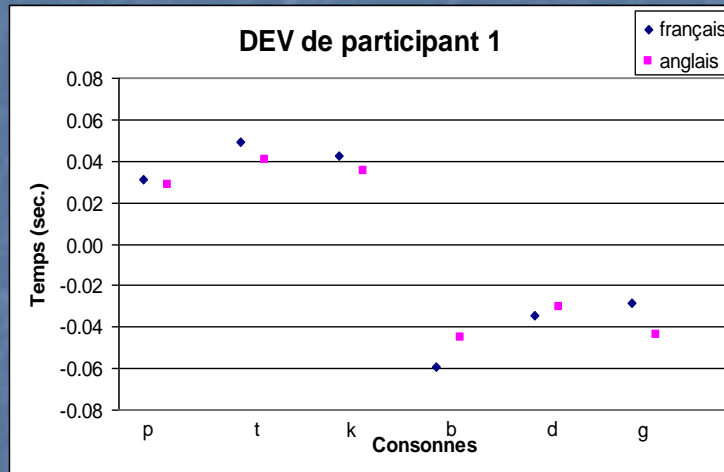
Translation of French section

Also, as always, students have to listen to the radio a lot and watch programs in French. If one repeats things like idioms, one will learn more vocabulary. It is also necessary to live in a French environment. If students listen to this advice, they will exceed their expectations.

Combined Participant VOT



Participant VOT - Analysis



- Pattern of positive VOT for voiceless stops and negative VOT for voiced stops eg. Participant 1
- Participant 3 was the only one to diverge from this pattern with a positive VOT for almost all occurrences

Hybrid System

- The voiced plosives of Participant 3 lie outside the range for the other 7 participants
- For 7 out of 8 of the speakers, their VOT does not pattern with either the French or the English systems
- Hybrid system created
- Participants reacted similarly regardless of native language

	Voiceless Plosives	Voiced Plosives
Hybrid System	Positive VOT	Negative VOT

Areas of Further Research

- Age of language learning
- Level of fluency
- Multilingual or bilingual in other languages

Speaker Identification

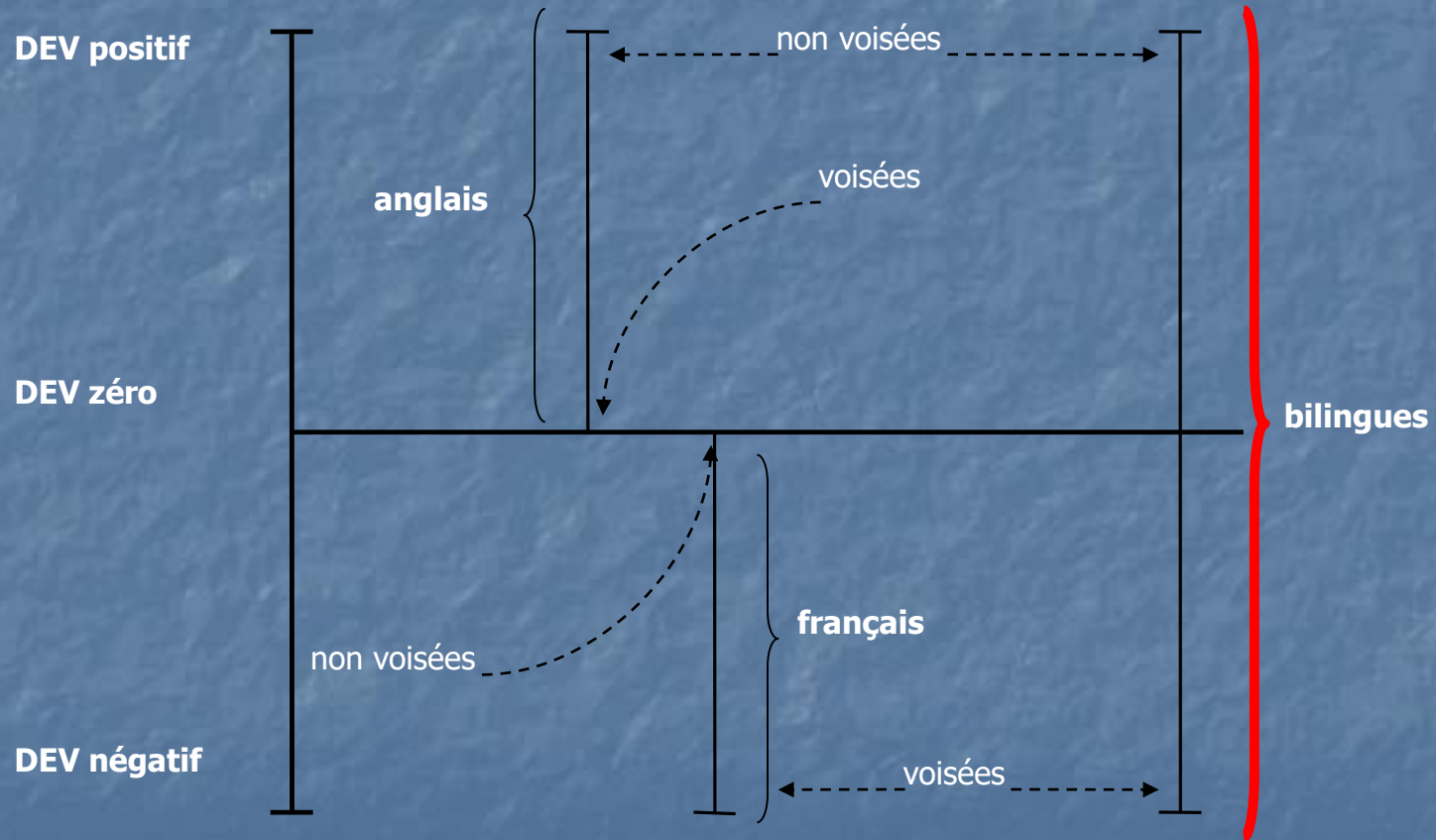
- VOT mean and deviation may be useful for identification purposes?
- Effects of nervousness
- Reading vs. Spontaneous speech
- Effects of the telephone
- Canadian French affrication
- Larger number of participants with similar voice qualities

Conclusions

- VOT does not vary considerably between languages or between participants
- Use of Hybrid system regardless of native language

Language	Voiceless plosives	Voices plosives
English	Positive VOT	Zero VOT
French	Zero VOT	Negative VOT
Hybrid	Positive VOT	Negative VOT

Conclusions



Questions or comments
are welcomed