

Introduction

Speech-in-speech comprehension or the “cocktail party” phenomenon : an everyday situation, primary problem experienced by hearing-impaired people.

Two types of masking:

- **Energetic masking**: overlap in time and frequency between target and background.
- **Informational masking**: information from target and background is of comparable nature. Highly relevant in the case of speech-in-speech situations as background carries linguistic information.

Informational masking may occur along the different psycholinguistic dimensions that characterize speech sounds: influence of the “speechness” (natural vs. reversed speech; Hoen et al., 2007) and of the language of the background (e.g. Mandarin vs. English; Van Engen & Bradlow, 2007) on target speech intelligibility.

Aim of the study: examine informational masking at the lexical level during speech-in-speech comprehension.

- To what extent lexical information from background is processed and can compete with recognition of target speech?
- Determine whether and how frequency of words that compose the babble can influence lexical access to target words?

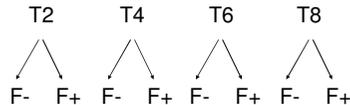
Methods

Participants

32 healthy right-handed French native speakers, aged 18-26, with no hearing or language impairment.

Stimuli

- 120 bisyllabic words, 120 bisyllabic pseudo-words embedded in sequences of 4s of mixed multi-talker babble (SNR = 0)
- 4 Number of Talkers x 2 Babble Word Frequency
- F+ and F- babble matched for *F0* and speech rate



Task

Lexical decision to target items: decide as quickly as possible whether the target item is a word or a pseudo-word by pressing one of two buttons on a keyboard.

Measure of Response Times (RTs) for words (from word onset).

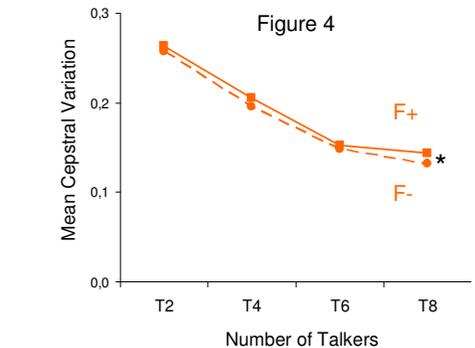
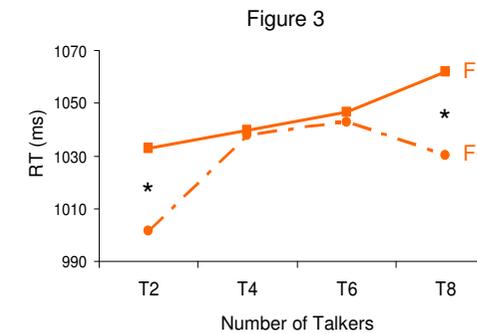
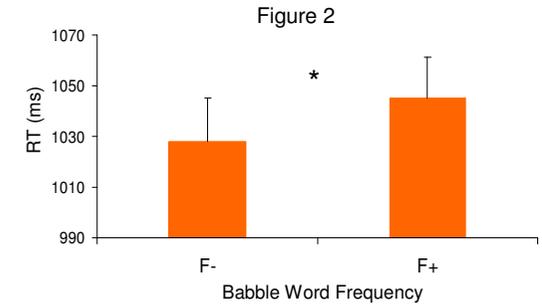
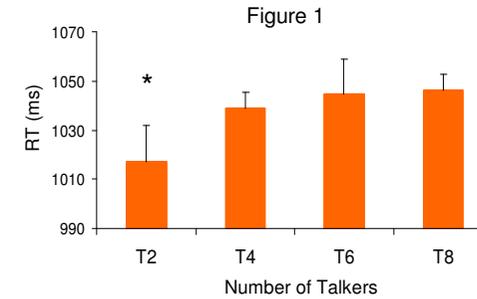
Statistical analysis

2-way repeated-measures ANOVA (Number of Talkers x Babble Word Frequency)

Acoustic analysis of the multi-talker babble (see Hoen et al., 2007 for details)

Measure of mean cepstral variation (i.e. cepstral distance between consecutive subphonemic segments) for each multi-talker babble (using a statistical algorithm of detection of acoustic changes)

Results



- Effect of the Number of Talkers in the babble on RTs ($p = .01$): T2 < T4, T6, T8 (Figure 1)
- Effect of Babble Word Frequency on RTs ($p = .001$): F- < F+ (Figure 2)
- Number of Talkers x Babble Word Frequency interaction ($p = .04$): F- < F+ only for T2 and T8 (Figure 3)
- Acoustic analysis: babble word frequency in T8 due to differences in cepstral variation between F+ and F- (Figure 4)

Conclusions

- Lexical properties of the babble contribute to informational masking during speech-in-speech comprehension.
- Cocktail party situations as a new paradigm to:
 - investigate competitive mechanisms that occur in real-time at different linguistic levels during language processing.
 - address the issue of unconscious speech processing (auditory subliminal priming).

Bibliography

- Boulenger et al. (2010). Real-time lexical competitions during speech-in-speech comprehension. *Speech Com*, 52(3), 246–253.
- Hoen, M. et al. (2007). Phonetic and lexical interferences in informational masking during speech-in-speech comprehension. *Speech Com*, 49, 905–916.
- Van Engen, KJ & Bradlow, AR (2007). Sentence recognition in native and foreign-language multi-talker background noise. *J. Acoust. Soc. Am.*, 121(1), 519–526.