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DICHOTIC PITCH PHENOMENA AND THEIR COMMON BASIS

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INTRODUCTION

Noise plus the same noise delayed, presented to one ear (monotically), produce monotic repetition pitch (MRP) [1]. Noise presented to one ear and the same noise delayed presented to the contralateral ear (dichotic presentation) produce dichotic repetition pitch (DRP) [2]. Addition of a second (uncorrelated) noise, presented to both ears (see Fig.1), gives rise to the pitch phenomena reported by Fourcin (FP) [3] [2].

The goal of the present study was to repeat and to extend the experiments on FP and to investigate the relationship with DRP.

EXPERIMENTAL RESULTS

Essentially, the stimuli were generated by a set-up as sketched in Fig.1 (n1: noise 1; n2: noise 2; τ_1: delay 1; τ_2: delay 2). Different noise polarities (+,-) are indicated in Fig.2 by the polarities in the cross-correlation function. Pitches were matched by adjusting the delay of an MRP-stimulus producing the same pitch. The average results of 3 subjects are represented in Fig.2 by experimental formulas, for τ_1 variable and τ_2 fixed.

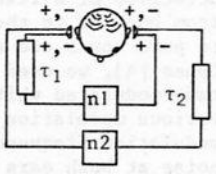

Fig.1.Stimulus configuration

DRP=1000/τ_1 (or:1000/(τ_1±0.9))	FP= 1000/(τ_1+τ_2±0.9) DRP=1000/τ_1
DRP=1000/(τ_1±0.9)	FP= 1000/(τ_1+τ_2) DRP=1000/τ_1
FP =1000/(τ_1±0.9)	FP= 1000/(τ_1-τ_2±0.9) DRP=1000/τ_1
FP =1000/τ_1	FP= 1000/(τ_1-τ_2) DRP=1000/τ_1

Fig.2.Experimental results;FP in Hz-equivalent,τ in ms.

CONCLUSION

For τ_1>4 ms , the results disagree with Fourcin's [3] rules.

Although the exact nature of the binaural interactions involved and the functional differences between the stimuli are still unknown, we obviously may hypothesize a common (physiological) basis. This because of the quantitative and qualitative similarity of the pitches. Like for DRP, a "central spectrum" model [2] might apply.

REFERENCES

[1] F.A. Bilsen, Acustica 17 (1966),295;[2] F.A. Bilsen and J.L. Goldstein, J.Acoust.Soc.Amer., febr.1974; [3] A.Fourcin, in Frequency Analysis and Periodicity Detection in Hearing, Leiden (1970),319.