

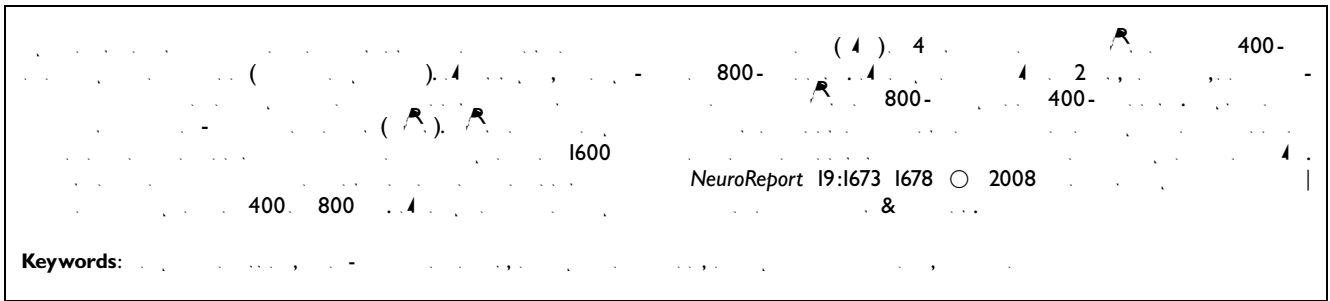
# Both frequency and interaural delay affect event-related potential responses to binaural gap

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## Introduction

ITD, 0.5, 1, 4, 1600, 400-800-400-800-400-800

H 1. ITD, 4, 1600

2.5.C 6,7, T ITD 0

I T ( ) ITD T

1) 2,3.I 1 0 3.5.T

S 2.E A ITD.

(ERP) ITD

2,6,8,9.R

.P , , A S 100H 2

M 1/3

( ) , ITD). I

ITD 0 , =22.1 , 13 ) (18 29

## Methods

T - =22.1 , 13 ) (18 29

( 15 B .T ) - 10 . T  
 . A 125 8000 H ,  
 , E 1000 .  
 (EMI S A E -  
 . T - N A S S A ) (C L , V ,  
 12 . N S S A )  
 G 1 E 1 2 - A ) . P  
 H E 2. T C 1 2 - . D ( : 0.05 40 H ;  
 P A U S D P - : 1000 H ),  
 C P G  
 2000 ( 30- / ) . F  
 MATLAB (T M I ., N , M , S (C L , V , A N ) . D  
 USA) 48 H 16- ERP 1500-  
 . T 200- ERP 100- . D  
 2 . N ERP 100- . T 2400-  
 ( ± 100 mV )  
 (SPL)  
 T G . F , ERP  
 512- - FIR 10 H - . A ERP  
 512- - FIR - 20 H .  
 800, 1600 H ( =1/3 ) . T E 1 ITD E 2,  
 C SB A 2 S, C T S L , N1 ( )  
 S ) ) 100 210  
 ) P2 ( 210 350  
 T 56 B SPL. )  
 ERP 10 , (F1, F , F2, FC1, FC , FC2, C1, C , C2)  
 200- ) . T  
 ) . T  
 . ERP

**Results**

T  
 96.88% (SE=1.04%) E  
 1 98.59% (SE=0.50%) E 2. T  
 ERP . I

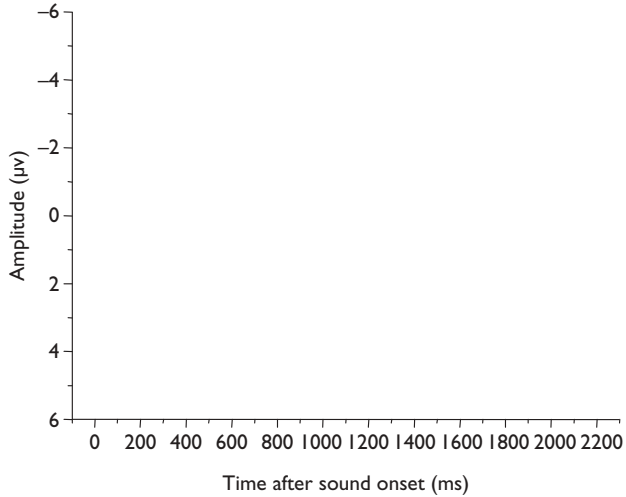
**Experiment 1**

F 1 ERP  
 FC ITD 0 . C ,  
 N1-P2 , . F ERP  
 N1-P2 - - ERP  
 . F  
 (ANOVA) - N1-P2  
 F(3,33)=18.883, P<0.001 . P - t-  
 ERP

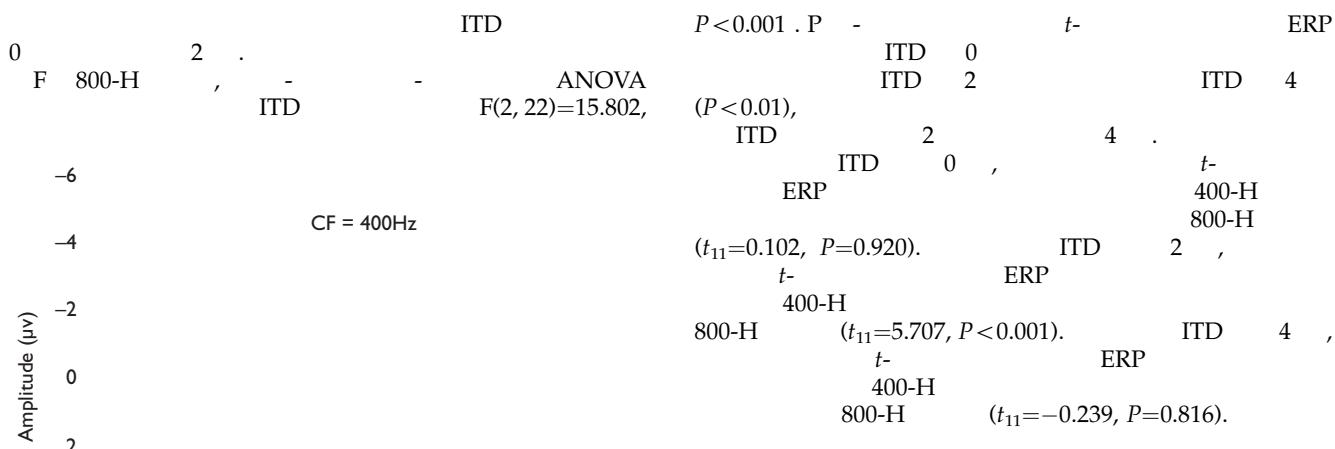
I E 1,  
 S 400, 800, 1600 H ITD  
 0 . E  
 160  
 32 . T 768  
 16 . I  
 10 . T  
 I E 2, 1000 .  
 400H  
 800H . T  
 ITD 0, 2, 4  
 . T 12 E -  
 2 . E ( ANOVA )  
 120 ITD )  
 24 . T 864  
 12 . I ,

( $P < 0.01$ ). N  
 ( $P < 0.05$ ). T  
 F 1  
 N1-P2  
 ERP  
 T ERP  
 1600-H

ANOVA  
 $F(3,33) = 8.998$   
 $P < 0.001$ . P  
 N1-P2  
 $t$ -  
 1600-H  
 400-H  
 800-H  
 400-H  
 ( $P < 0.001$ )  
 ( $P = 0.001$ ). T  
 ERP  
 800-H  
 ( $P < 0.05$ ) (



**Experiment 2**  
 I E 2, ERP  
 H 800-H  
 . A  
 ITD.  
 F 3  
 FC 400-H  
 ( )  
 800-H  
 ITD 0, 2,  
 4 . C , ERP  
 ITD. P , N1-P2 - -  
 0 4 ,  
 F 4  
 N1-P2 - -  
 400-H ( )  
 ( ) ITD . A ( 800-H )  
 (ITD) - ANOVA  
 $F(2, 22) = 18.187$ ,  $P < 0.001$ .  
 F 400-H , -  
 ITD  
 ANOVA  
 $F(2, 22) = 30.257$ ,  
 $P < 0.001$ . P -  
 N1-P2 ITD 4  
 ITD 0 ITD  
 2 ( $P < 0.001$ ). N



**Discussion**

I

. A

ERP

T

N1-P2

400-H 800-H

SPL, T

1600-H

400-H 800-H 1600-H

T

S

2

250 2000 H . T

N1-P2 ERP

ERP

2,3 . O

N1-P2

ERP

13 . H , , r<sub>w</sub> , 2 , ITD, N1 P2 -  
 , 22,23 . T -  
 I , ERP I , -  
 ITD , ITD. M , 400-H . ERP  
 , ITD 4 , ITD -  
 2 , ERP ITD ITD. T -  
 . F 800-H , , ERP ITD .  
 O 2 4 , ERP ( . . )  
 H 400-H 800-  
 H 14 , ITD -  
 . T ERP  
 I -  
 ITD 4 , J 15 .  
 A ( )  
 O ,  
 . A ITD 4 , -  
 , ERP  
 , 4  
 . I , -  
 -  
 A ERP -  
 ,  
 ( . . )  
 I ) ERP .  
 ,  
 16 ,  
 . T , 17 20 ,  
 A .  
 21 ,  
 ERP  
 . M ,

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T N N S  
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