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Syllabic tone articulation influences the identification and use of words during Chinese sentence reading: Evidence from ERP and eye movement recordings

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2 2015

Abstract 1, 100 250 400 2,

Keywords

(, , & , 2005, & , 2006,), (1) minimality hypothesis, ( ) (, , , & , 2001)— (& , 1 , 2006 & , 2005 & , 200 & , 2004 , , & , 200 , 2010

1 100 1,
2 ( )
3
4

4 (200) (2014),

neutral-tone word.

/

(200)

(, , , & , 2012 , , & , 2013)

I (2014),

(, 2012).

(, , &I , 2014)

/

(. .,)

neutral tone

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, 200 ,) ( )

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& , 200).

(. & , 200),

火 " " 3

(" "),

火柴 (" "),

炉火 (" ").

, 柴火 (

" ")

(2014),

2.

. I ,

(&I , 2010 I , , ,
, & , 2004)

Experiment 1

I

100 250

(& , 200 &
200),

(, 2014).

400

400

(2014). I
400

Method

Participants

32 (1
14) 1 2 (22)

( ).

Material

(. .,
)

(
1), F < 1.

(& , 2010). I
3. (SD 0. 3) 3 (SD 0. 4) 5- (12). $F(1, 112)$ 1.102, p .2 , 1
5. 1 (SD 1.22) .02 (SD 1.0) $F(1, 112)$ 0. 3 , p .335 , (2).

( ).

Table 1

−1 (. 1)				
	2.5	1	2. 4	1
SD	1. 5	5.	1.24	5.5
−1 (. 2)				
	2	.3	2.	15.0
SD	1.4	5.	1.2	4.2
	2.0	.1	2.03	.3
SD	0. 2	4.0	0.	3.
+1 (. 2)				
	2.	.3	2.	15.5
SD	1.1	3.	1.02	4.4

10

Table 2

( )	233	2 1
( )	64.6	65.4
(5-)	3.	3.66
( )	5. 1	6.02
(%)		4

114

(. ., *shi-huan*),

5

10–15 . 4 ,

16-

(, 2004). (,

2013),

(& , 2005).

(. .,)

(233 . 2 1), $F(1, 112)$ .003, $p < .001$,

(64.6 . 65.4), $F(1, 112)$ 1. 3 , p .055,

(2).

114

(. 1).

, 10 16 ,

— . (

, SD 0.).

— , *pretarget words*—

(1), p .3.

— —

( )

3 55 (% 4 %,

$F(1, 112)$ 1.436, p .233 2 . , 1

, p .1,

Procedure

100

24

500 , 200-

, 400 ,

400-

114

5-

very easy *very difficult*.

Neutral tone condition					
Chinese	老板	总是	使唤	秘书	来 帮忙 处理 私事。
Interest Regions		Pretarget	Target	Posttarget	
Pinyin & Tone			shi3 huan		
Literal Translation	Boss	always	order around	secretary	to help conduct private business
Translation	The boss always bossed the secretary to help take care of his private business.				
Full tone condition					
Chinese	会计	经常	使用	算盘	来 核对 账目。
Interest Regions		Pretarget	Target	Posttarget	
Pinyin & Tone			shi3 yong4		
Literal Translation	Accountant	often	use	abacus	to check accounts.
Translation	The accountant often used abacus to check accounts.				

Fig. 1

1.4 ($F < 1$) (2, 4). 15

1,

000

(/

& 1 6)

, & , 2014)

EEG recordings

( ) I 10–20 , (, ,). ( ) 5 Ω. 0.016- 100- 500 (, . ., , , , 2012 , 2014)

15 ((1, 3), (1, 3), (1, 3), ( ), ( ), ( ), (2, 4), (2, 4),

Data analysis

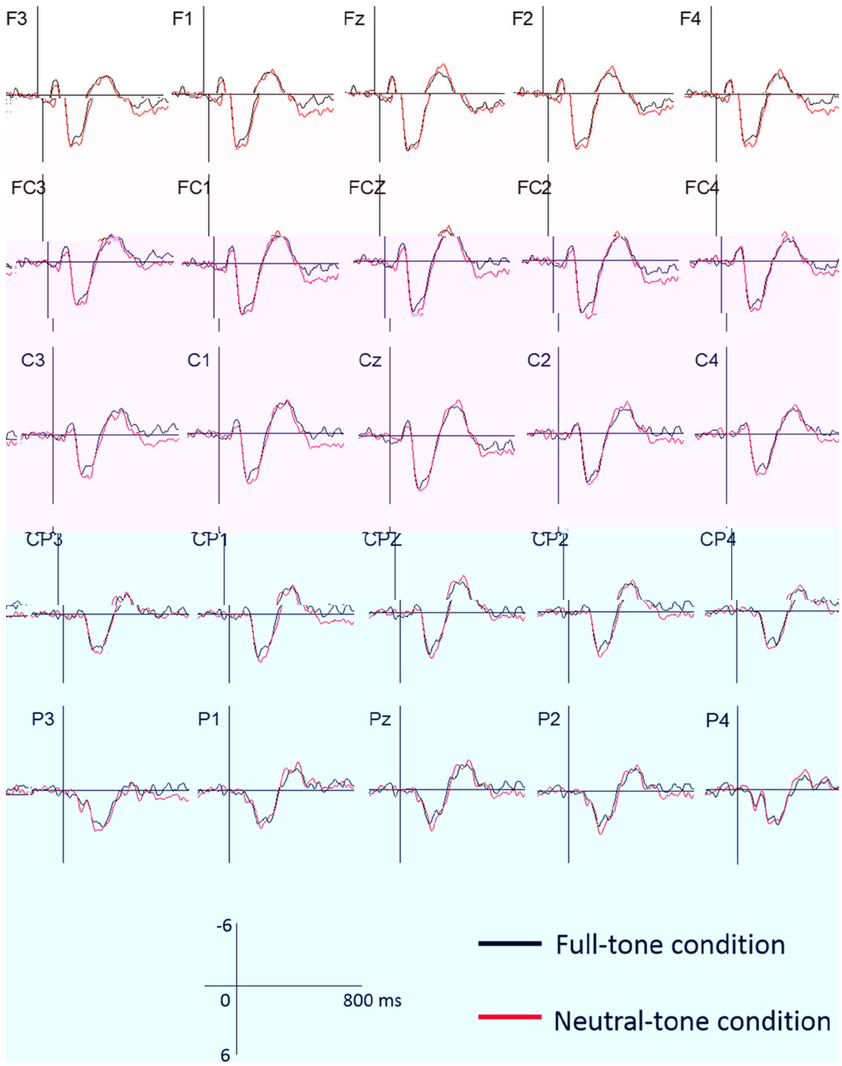

Fig. 3

250

N250 250 , *b* 0.41 μ , *SE* 0.12, *t* 3.46. (4, 250) 200 400 , 250 (, , , *b* −0.21 μ , *SE* 0.10, *t* 2.12. , & , 2010 , , , & 100 , 200 & , 2012). 100 100, *b* 0.12 μ , *SE* , *b* 0.34 μ , 0.04, *t* 3.1 . , 250 *SE* 0.11, *t* 3.00. , *b* −0.25 μ , *SE* 0.0 , *t* 3.12. 6, , *b* 0.31 μ , *SE* 0.11, *t* 2. 5, *b* −0.24 μ , *SE* 0.0 , *t* 3.0 , .

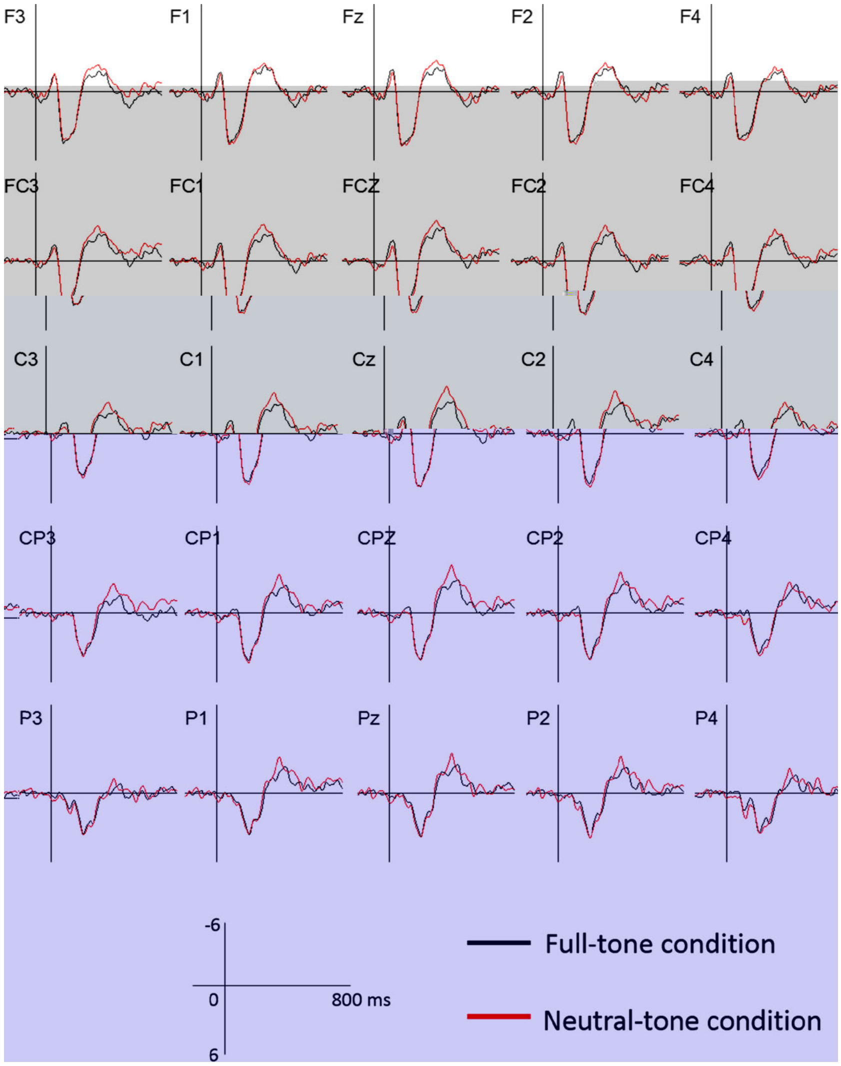

Fig. 4

N400 400 , *b* –0.?0 μ , *SE* 0.13, *t* 4.?2. , *b* –0.? μ , *SE* 0.14, *t* –4. 4. 250 , *b* 0.34 μ , *SE* 0.04, *t* .12. 250 , *b* –0. 2 μ , *SE* 0.13, *t* 5. 3, , *b* –0. 1 μ , *SE* 0.13, *t* ?.0?.

P600 ?00 , *b* –0.32 μ , *SE* 0.14, *t* –2.1 .I , *b* –0.14 μ , *SE* 0.05, *t* –2. 0. .I 400 , *b* 0. 0 μ , *SE* 0.03, *t* 2 .0 . , *b* 0.14 μ , *SE* 0.10, *t* 1.3 .

Discussion

100 250 400 , 100

[redacted]

Fig. 5 100 [redacted]

250 400 [redacted]

100 250 [redacted]

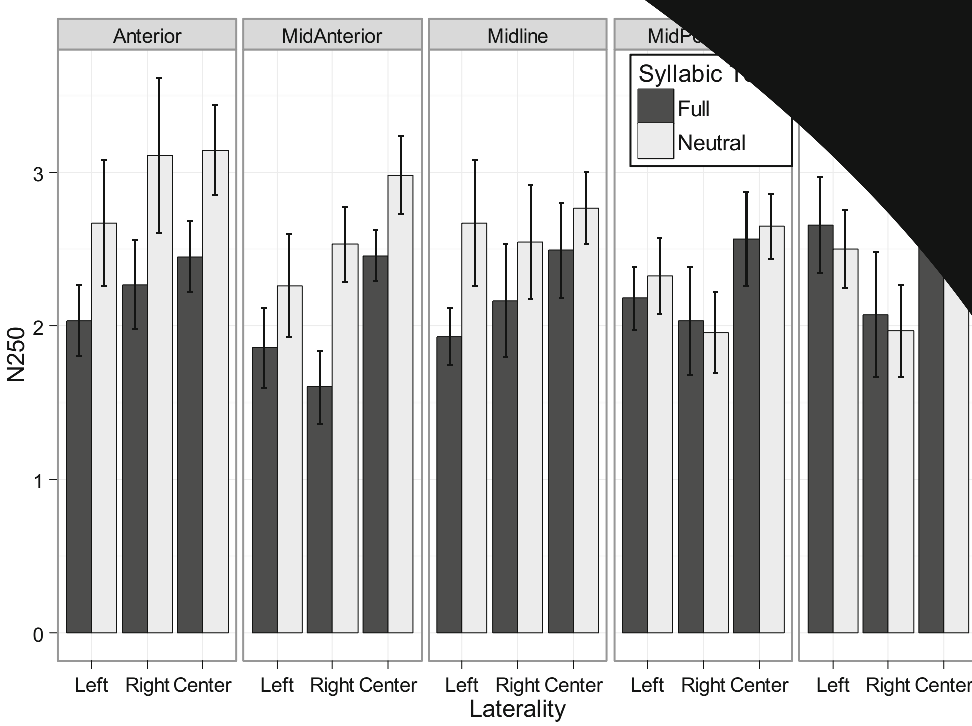

Fig. 6 250 *SE*

100

(2014), ( ), 400 (200 , 2011) 400 (& , 2011), (& , 2012). 400 400 (. ., & , 1 5 , 2005 & - , 200). (, 2013,)

Experiment 2

2

(2014). (, 2004)— (2004), ( ) (&I , 2010). 2 ’ (2004) (. ., &I , 2010 , 2004),

Method

Participants 50 (1 2)

Material 1.

N–1—

N,

, p .1 (1).

13 25

1

(. ., " 3 " " 3 "), (" 3 " " 1 "). ( ) (1-) 1 /41.1

102 300 , 1 1 (SD 2), 1 4 (SD 21), 1 5 (SD 21) , F < 1.

114

(n 1)

(. ., & , 2010 , 2004).

( )

Apparatus 2 , 2000 0.2 ,

21- (1,024 100). -20 0.5

0

(- 00) 0

4 .

Procedure

0.5

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, 24

1,

4- , 1 *most easy* 4 *most difficult.*

(1.3 . 1.3), F < 1.

Measurement and data analysis

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(. ., , & , 2005 , & , 200).

(& , 2005).

(, 2014).

(, 200).

1. %

10 %

(. .,).

5 00 .

.4 %

20 ( )-245( )1 ( )-540( )21( )3( )21(-15( ) 2 . 24 002 4. 00011 (.)1 ( )15( ) ( )-)15
11( )13( )1 ( )-21 ( )25( )1 ( ) 5( )-234( )-143( )20 150( )1 ( )21( ) ( )-3 4
( ) 0( )-3 5( )-3 (,)-312( )-3 3 ( )-3 ( ) ( )-3 3

(.)- 0 ( )1 (4 ( )15( )-3 3( )21( )-1 1( )1 ( ) 4( )1 ( )20( )15( )-3 3( )1 ( )1 ( ) 3( )-1 1 4 1(
(434(,)-245) -
150( ) 0-1.24 00005 ( )1 ( )14)1 150( )1 ( )14
(

Table 3 2 ( ) ( )

	2 (.2)	2 (.1)	2 4 (5.3)	2 (.3)	2 (5.)	2 (.5)
	313 (.)	321 (10.2)	325 (.3)	33 (11.3)	33 (.)	33 (.)
	3 1 (13.3)	3 3 (14.2)	3 3 (10.5)	3 4 (13.)	40 (13.)	400 (12.)
	2 2 (5.3)	2 (.2)	2 2 (5.0)	2 5 (.2)	2 (.)	2 (5.)
	320 (.5)	312 ( )	301 (.2)	32 (.1)	314 (.0)	312 (.5)
	3 1 (10.)	3 (10.3)	35 (12.3)	3 (12.3)	3 (12.0)	3 4 (13.4)

(–4), b –0.01 , SE 0.013, t 1.41, (–1) (–31), b –0.04 , SE 0.020, t 2.24, b –0.0 2 , SE 0.025, t 2. , .3 % . %,), b –.352 , SE .1 1, z 2.0 . (1.20 1.24,). , b .1 , SE .103, z 1. 3, p < .1.

(2014) (2005), . (3 5 ,), (t < 1.5). (11), b –.00 , SE .005, t 1. 5, p < .1. , t < 1.5.

Posttarget word region t < 1.4. ( ), (14), (10) b .00 , SE .004, t 2.21 b .013, SE .005, t 2. b .011 , SE .005, t 2.21, (2, , 13 ,) , t < 1.5, , , t < 1.5. .

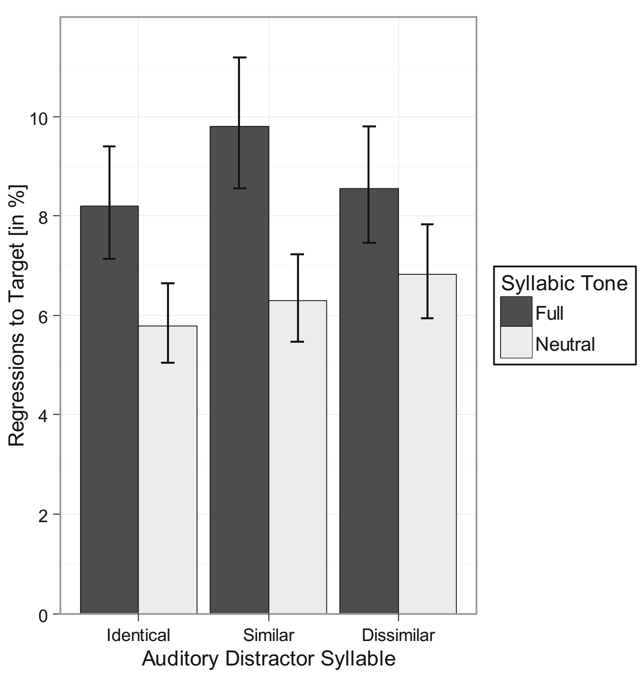

Fig. 8 SE 5 %

Discussion

2,

(2014), (2014), 1.

2,

longer

(, 2005 , 200),

(& , 1 , 2004 , 2010)

(“ ”) (“ ”),

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( )

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(, 200),

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(2014)

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longer

(& , 2010 , 2004)

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, 2011).

General discussion

(, 2014).

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250

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(& , 200 , 200 , 2010), (& , 1 , 2010 , 2004).

(& , 200 & , 2004).

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(. ., " ' " . " " " ' " " ").

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’ (2014)

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Appendix

45

5

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( ) (

, & , 1),

Morphological Structure		
	25	2
	22	1
	4	2
	3	3
	1	3
	1	1
	1	1
Morphemic Status		
(2)	2	2
	2	2
	41	41
	[illegible]	[illegible]

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