A en ion mod la es ne ronal correla es of in erhemispheric in egra ion and global mo ion percep ion

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In earl re ino opic areas of he h man is al s s em, informa ion from he lef and righ is al hemifields (VHFs) is processed con rala erall in o hemispheres. Despi e his segrega ion, e ha e he percep al e perience of a nified, coheren , and nin err p ed single is al field. Ho e ac l he is al s s em in egra es informa ion from he o VHFs and achie es his percep al e perience s ill remains largel nkno n. In his s d sing fMRI, e e plored candida e areas ha are in ol ed in in erhemispheric in egra ion and he percep al e perience of a nified, global mo ion across VHFs. S im li ere o-dimensional, comp er- genera ed objec s i h par s in bo h VHFs. The re inal image in he lef VHF al a s remained s a ionar , b in he e perimen al condi ion, i appeared o ha e local mo ion beca se of he percei ed global mo ion of he objec . This percep al effec co ld be eakened b direc ing he a en ion a a from he global mo ion hro gh a demanding fi a ion ask. Res l s sho ha la eral occipi al areas, incl ding he medial emporal comple , pla an impor an role in he process of percep al e perience of a nified global mo ion acrоss VHFs. In earl areas, incl ding he la eral genic la e n cle s and V1, e obser ed correla es of his percep al e perience onl hen a en ion is no direc ed a a from he objec . These findings re eal effec s of a en ion on in erhemispheric in egra ion in mo ion percep ion and impl ha bo h he bila eral ac i i of higher- ier is al areas and feedback mechanisms leading o bila eral ac i i of earl areas

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pla roles in he percep al e perience of a nified is al field.

In rod c ion

E

(G , 2000; T , S ; S , & H , 1988).

. H

. O

. P ,

(HF) (A. T. S , ; & S , 2004; T , M , H - , L , & D , 1998; L & , 2004). H ,

. I 1

(L & R , 2000; & F , 1998). T ,

-

(C & M - , 1990).

D , -

. L , C , H (2009), MRI EEG , . T -

(1) (LOT) , MT+. I - , MT+ 1 . T - MT+ LOT , 1. . (2004) EEG MRI . T LOT , MT+, . B . H ,

HF ; . T , L .

B . (2006) MRI . T ; 1, 2, 3, . T

; 1, 2 , 3 , . B .

, ; . H , B . , 1, 2 , 3 .

A . A MRI (G , H , & B , 1999), -MT+ (B , B , M , & , 2009; C ., 2011; S , B ; & B , 2002; H , K , & G , 2007; , A -E , P , & T , 2006). F , (L & R - , 2000). T ,

HF , MRI . I , P - ”

(F 1,). T P -

Methods

Participants

MRI data acquisition

30° × 22°

CIE

S im li

A

J

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G

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T

: T

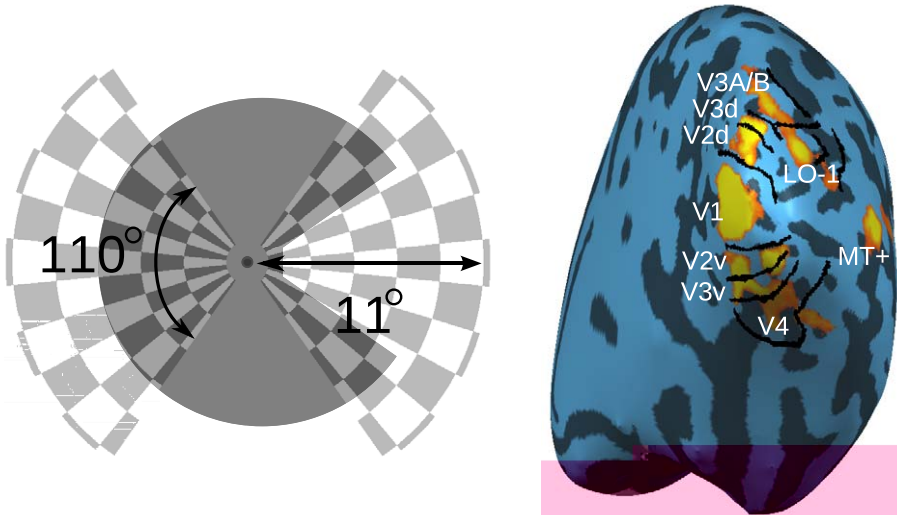


Figure 3. ROIs were identified using wedges texture-mapped with counter-phase contrast reversing checkerboard patterns in early visual areas (the Pac-man figure in the background is shown here for visualization purposes; it was not present in the actual experiment). For MT+, moving random dots were used as a localizer. Boundaries between early visual areas were drawn using the results of a separate retinotopic mapping session for each participant. The image on the right shows ROIs and visual area boundaries on an inflated brain of one participant.

, MT (H ., 2002; M ., 2000). H , . T , MT+.

Re ino opic mapping s im li

A . R . T . T 30° 30° 10 ; 360° 12 . T . T 2° 1° 14°. E 10 . T 10 . F , 3A/B, LO-1, LO-2 ; L H (2006) (T ., 1997). T 3-D . B MR (E , G , & , 1997; S ., 1995).

MR da a processing and anal sis

F B - Q (B I , M , T N). P , 3-D , , - (0.015 H) (A. M. S ., 1999). N MRI . A , - , . F ROI - B Q . ($p < 10^{-4}$,) . F - ; , J . T . A - , (F 5), - (12 -) . A ,

P - : ( ) D
(F 6). *not*
F ,
t (. .,
P -
).

Beha ioral e perimen

(P -)
. S MRI -
( ). O -
12 : F ,
. A ,

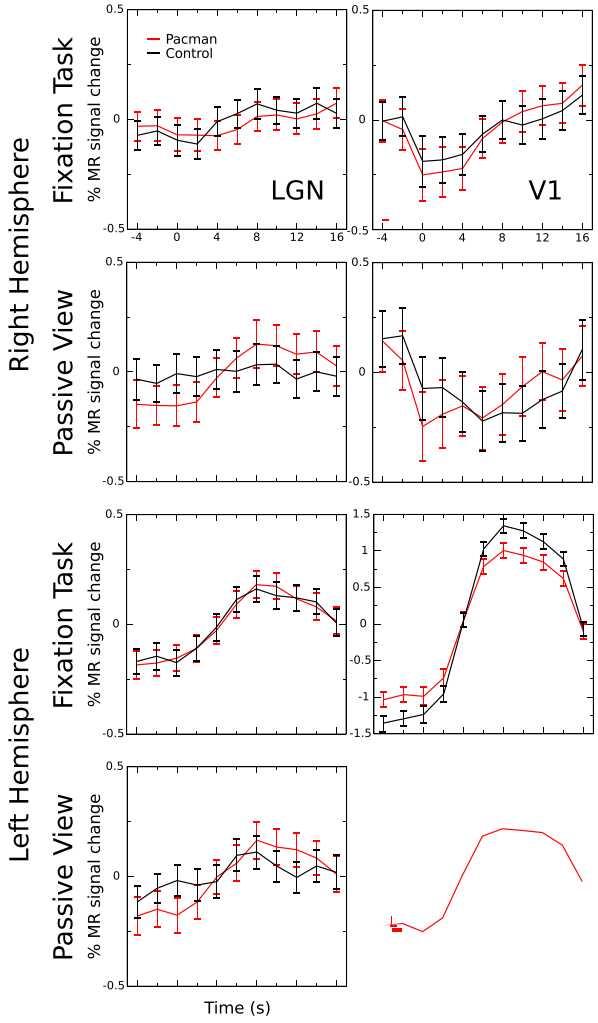
64 . T ’ - . T . E (250 ;) , . T : S - , : (P - ,), (MANO A) (ANO A).

Res l s

? I P - ; HF , HF . T ; (RF) HF , . O , RF HF, . C - , ; : . A , HF ; P - . I ; HF . F 4 F 5 - P - ; . T ; . T - , (: 85% P - , 76% $\alpha = 0.05$ ’ RT = 653 665 , $\alpha = 0.05$). T I N MR (A. T. S ., 2004; T ., 1998). I (12) P - . I ; ROI, MRI P - . R F 6. F , - ; - , 3A/B, LO-1, MT+, P - . I , , - , T - , LGN. T - . I , P - (F 5), 1, P - LO-1 3A/B ($\alpha = 0.05$). T , - - ; .

Beha ioral e perimen

T , 12- P - ( ) not ? ( ) , (/). P - - ” (. ., N , not ”); .” P - , ,” ,” .” A



$= 0.947, F(2, 964) = 27.18, p < 0.0001$. N

$\alpha = 0.01$. T

ANO A

($, F(1, 965) = 22.41, p < 0.0001,$

$, F(1, 965) = 28.36, p < 0.001,$. N

$\alpha = 0.01$. T

$-0.46°$

(0°) $(SE = 0.03)$

$-0.66°$ $(SE = 0.032)$

. T

$0.77°$ $(SE = 0.042)$ (0°

( )) $0.45°$

( ), $(SE = 0.044)$.

E e- racking e perimen

Passive View

Average % MR signal difference

Disc ssion

3A/B, LO-1, MT+ P

LGN, P . I . T HF . T (T ., 1997). M L MT+, L (A. T. S ., 2004; T ., 1998) L . (2009) 1 LOT MT+, LOT 1 (., 2004). T MRI, MT+ (B & B , 2005; C & M , 1990) 1 (B & B , 2005; L & R , 2000). T MT+ M LGN (L & R , 2000; S , P , & H , 2004). G 1 (B & B , 2005), MT+ (., 2004) 1. S LGN . T . T

LGN MT+ K (B & B , 2005; S ., 2004), . I LGN (SC), SC MT (B , 2004). M SC MT (B , 2004; C , 2004). I MT+ SC LGN . T 1, 2, 3 MT . C (G , 2000; N & C , 1996). I G ç, B , S , K (2011), MRI DTI, MT 1 . T MT S MT (C & M , 1990; G ç ., 2011) 3 3A/B (C & M , 1990) 1, 2, 3 (C & M , 1990). T HF . MT 1, 2 3 (B & B , 2005; B , 2004). H 1, 2, 3, MT . T MT+ .

E MT+ (B & B , 2005; C ., 2011; C , H , D , & , 2001; O'C , R , K , T , & S , 1997; S ., 2002). M , (G ., 1999) LGN (O'C , F , P , & K , 2002).

. T ,

HF

. T

(L & R , 2000; & F , 1998).

P RF MT

70°

(B , 2013; B , M , & , 1998; M , B , & , 1995). M , MT RF

, RF

(B ., 2009; C ., 2011; ., 2006; H ., 2007). M , (O'C , D , & K , 1999; R , L , & S , 1998),

(M M & S ; 2004, 2005) ((S ., 2002; T & T , 1999)

HF MT.

O B . (2006),

2 3

. T

R ,

P .

. I

MRI

: O ,

P

MRI

P

P ,

. H ,

: T

RF ; 1/2,

B . (2006) . N

P (85%

, 76%) : T

P

(P

LOT 3A/B, MT+, LO1). H , LOT

Concl sions

T ,

. O

3A/B, LO-1, MT+ ( ),

Keywords: global motion perception, interhemispheric integration, fMRI, visual brain, perceptual experience of unified visual field

Ackno ledgmen s

S S T R C T "1001" (108K398), E C M C I R " (PIRG-GA-2008-239467), T A S "D I " . A M , C M R R NIH N B I C C G (P30 NS057091). HB KD F C , S D .

C . C : H B . E : @ . . . A : D P & N M R R C , B , A , T .

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