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A

Social status modulates the neural response to unfairness

H ,[1] . B ,[1] H ,[1] G ,[2] ,[2]
C [2] 1,3,4,5

[1]C B C D , B 100871,
C ,[2] E C (E),
201804, C ,[3] (E), [4]B
B H , B 100871, C [5] - DG/ G
B , B 100871, C

C , D , B 100871, C . E- : 104@
H B .

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Abstract

G (G). B
G
(A) A
. A , G

Key words: ; ; ; CC; ;

Introduction

F
. E , G (G),
(G , 1982). G -
( )
( )
G

G . A -
G
(et al., 1989)
(
et al., 2011), (et al., 2012), -
(, 2011)
(et al., 2011).
A -
(A et al., 2013; H et al., 2014). A et al.
(2013) (
)

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© A (2015). . F : @ .

Materials and methods

Participants

Design and procedure

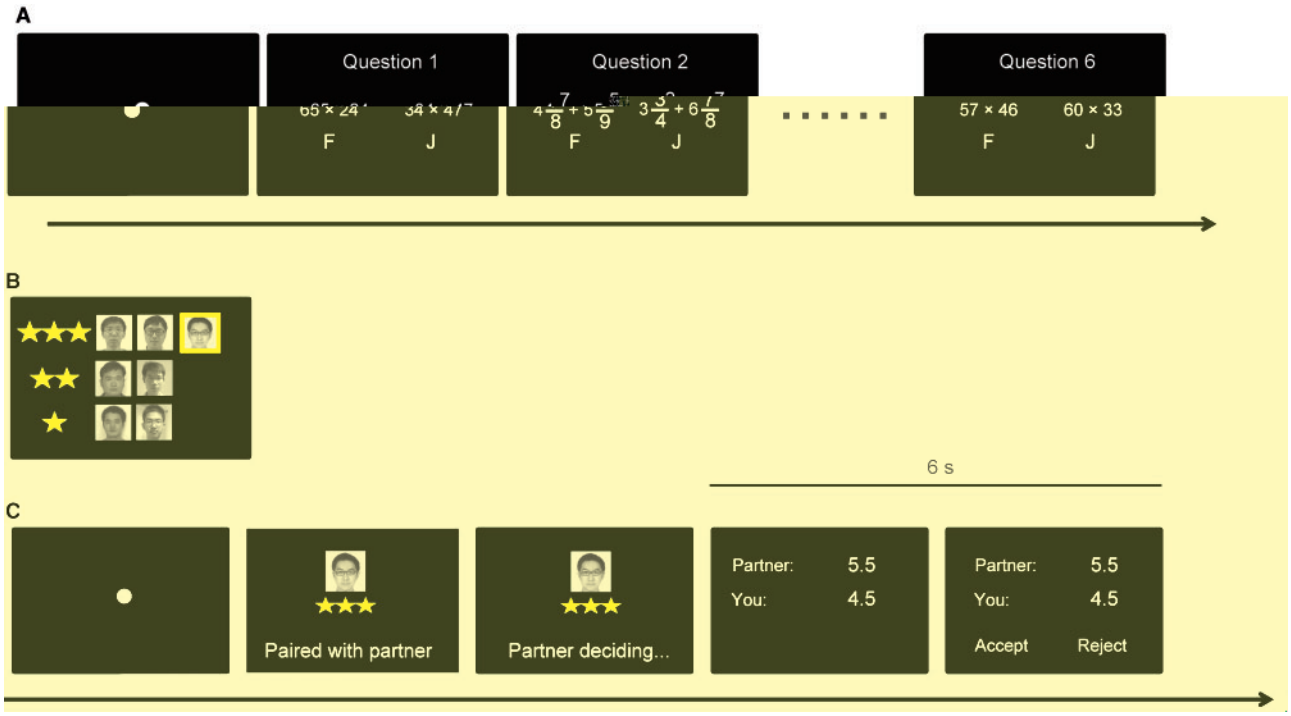

Fig. 1. (-); G. E (C). E G 24 G 1 2 3 3 (1000 2000 . A 3000 ( ) 3000 . A . A 3000 , . E ( ) 20 (, ,), 4 (: 1/9, 1.5/8.5, 2/8, 2.5/7.5, 3/7; : 4/6, 4.2/5.8, 4.5/5.5, 4.8/5.2, 5/5) . - (3.2/6.8, 3.8/6.2) 8 . 2 ; 24 G (10 , 10 4 -). - - . A 24 G, - 24 G. A G (. .) B , . 6 10 G . A , - 7- (A). 10 F_ _ , . A , - G (B). A G . E G , (1 2). A (1 5 10). 6). (1 = ; 7 =) . G (1 = ; 7 =). - , - : (10) - G G. F , - (. . -) A (A , 2000), C , - , - 10 G . F , / / .

MRI data acquisition

GE- , 750 3.0 , C . 2*- - - (B D) 40 - AC C 3.1 , - . , 2000 , 30 ,

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[illegible] 90° [illegible] 200 × 200 [illegible], [illegible] 3.1 × 3.1 × 3.1 [illegible].

fMRI preprocessing

[illegible] 8 ([illegible] D [illegible] C [illegible], [illegible], [illegible]), [illegible] A AB ([illegible]). F [illegible], [illegible] - [illegible] - [illegible], [illegible] - [illegible], [illegible] - [illegible], [illegible] 3 × 3 × 3 [illegible], [illegible] ([illegible]) [illegible] 8 F H G [illegible]. D [illegible] - [illegible] - [illegible] 1/128 H [illegible].

General linear model analyses

[illegible] - [illegible], [illegible] (G [illegible]) [illegible] - [illegible] - [illegible] (B D) [illegible], [illegible] - [illegible] B D [illegible] G [illegible] G [illegible] ([illegible] - [illegible]). F [illegible] - [illegible], [illegible] : [illegible], [illegible] - [illegible], [illegible], [illegible] - [illegible], [illegible] - [illegible], [illegible] - [illegible], [illegible] - [illegible] - [illegible] - [illegible]. A [illegible] - [illegible] (H, F). F [illegible] - [illegible], [illegible] ([illegible], [illegible], [illegible]) [illegible] - [illegible] - [illegible] ([illegible] > F [illegible], F [illegible] >

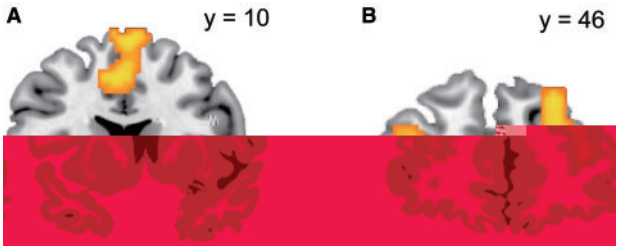

Fig. 3. - > ACC, A (A) D FC (B). A P < 0.05 (- P < 0.001 23).

/ F(1, 22) = 97.59, P < 0.001, η^2 = 0.81, - (5.26 ± 0.15) (2.35 ± 0.15). A , - F(1,22) = 12.58, P = 0.002, η^2 = 0.36 F(1,22) = 10.07, P = 0.004, η^2 = 0.31 . , - (3.4 ± 0.06) (3.0 ± 0.06), (5.73 ± 0.12) (4.94 ± 0.12). - - (r = 0.46, P = 0.028, *d.f.* = 21) , - - G (r = 0.82, P < 0.001, *d.f.* = 21). A , - - (.) (, P = 0.6; - , P = 0.35; , P = 0.74).

fMRI results

Main effects of social status and fairness. G, G B D - G - G G . C (*et al.*, 2003, B *et al.*, 2010), - , ACC, / (A/ CC; F 3A 1), D FC (F 3B). > ; , (P < 0.005, = 46 , P < 0.05 A), A (x = −39, y = 11, z = −8, *T*- = 3.10, *k* = 75). (>) - .

Interaction between social status and fairness. , - (–) – (H – H)

Table 1. B (- >) P < 0.05 (- P < 0.001, = 23)

		T-	(*k*)
	x y z		
: > F			
ACC/ A ,	6 23 37	5.20	479
D FC ,	36 50 16	4.75	182
	−36 50 22	4.12	45
: (>) > (H > H)			
A	−21 −4 −11	4.76	41
	−15 −19 4	4.16	47
G	−36 −22 64	3.66	54

Note. = ; = ; A = , H C= .

(x = −21, y = −4, z = −11; F 4A), (x = −15, y = −19, z = 4; F 4C) (x = −36, y = −22, z = 64; F).

(0.14 ± 0.02) (0.07 ± 0.02, P = 0.015), (0.08 ± 0.02) (0.12 ± 0.02, P = 0.140) (F 4B).

(0.04 ± 0.02) (−0.04 ± 0.02, P = 0.001), (−0.005 ± 0.02) (−0.02 ± 0.02, P = 0.469) (F 4D).

Correlation analyses. A , - - . F (H), A (2) - - (F 5).

Functional connectivity analysis. G A (H –) (F 5), - . A - - A CC (C , 2009) (F 6 2). A - A .

Discussion

. H , (*et al.*, 1967; , 2005; G *et al.*, 2007),

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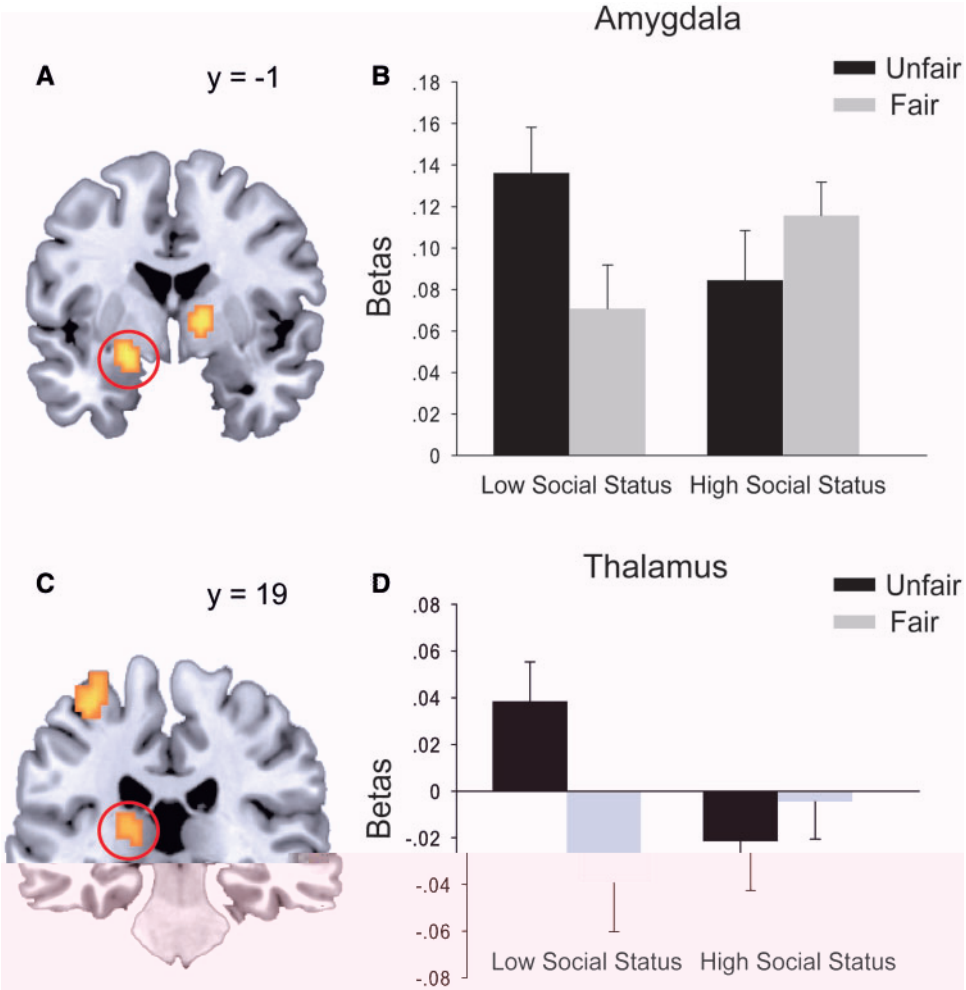

Fig. 4. (–) – (H – H)
(A). A ;
(B). (–) – (H – H)
(C). A ;
(D). 3
. A P < 0.05 (P < 0.001 23).

H
G. (B
et al., 2001; A *et al.*, 2013; H *et al.*, 2014).
. A
. A
A , ACC/ A G.
D FC *vs*
G
(*et al.*,
F 2010), 4 5
(G *et al.*, 2015),
A
(*et al.*, 2012).
A ACC/ CC
(F *et al.*, 2006),
A
ACC/ CC G,

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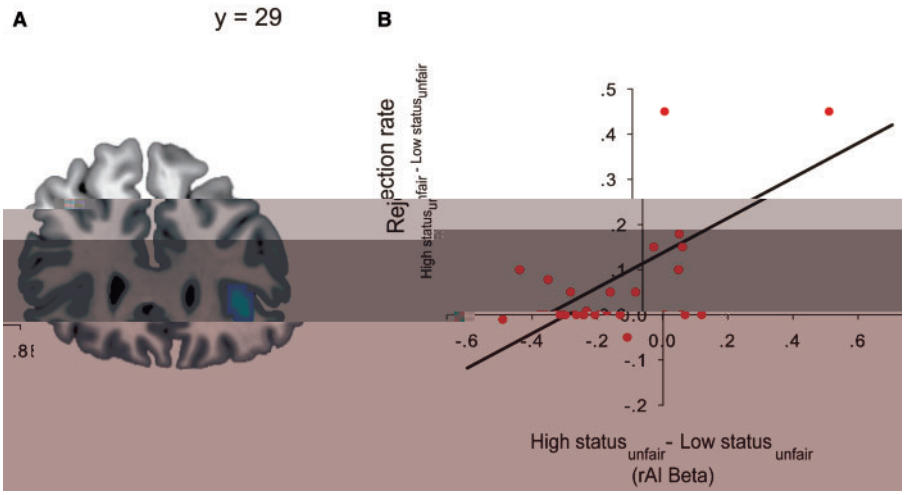

Fig. 5. G - (H) (A). A G G (B), (A). A G 2 3 - - -

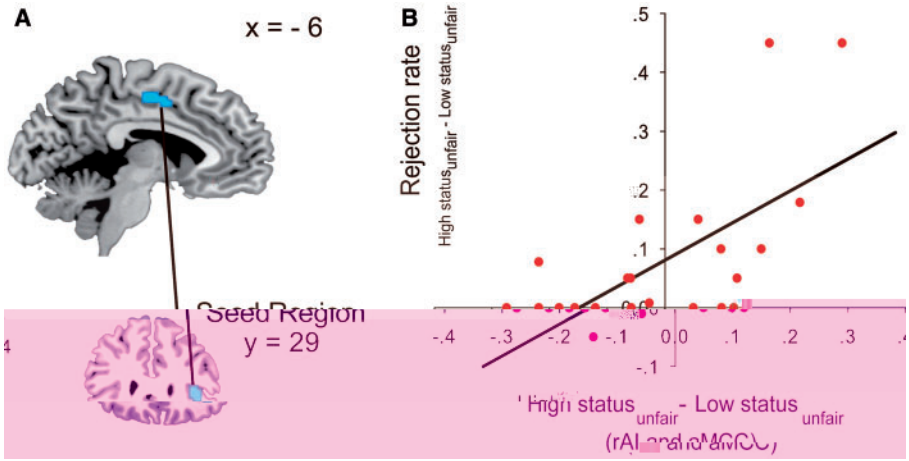

Fig. 6.

A ACC/ CC (A).

3

P < 0.05 (- P < 0.001

(A)

. C

(C , 2010; , 2014; *et al.*, 2014). F

(*et al.*, 2014).

, A *et al.* (2011)

;

. G

G

A

A

A CC

A CC

CC

A

CC,

(*et al.*, 2006; *et al.*, 2008; C , 2009;

A ACC/ CC (B).

2

. A

23).

et al., 2009).

et al. (2012)

A -

(ACC)

A - ACC

CC

A

-

vs

(*et al.*, 2003; C *et al.*, 2012; C -D 'A *et al.*, 2013; C , 2009; F *et al.*, 2015).

A CC

Conclusion

B G,

A CC,

. F

Acknowledgements

Funding

B

(973 : 2010CB833904, 2015CB856400)

C

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F C
(91232708, 31170972).

Supplementary data

SCAN .

Conflict of interest. .

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