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Gender Difference of Unconscious Attentional Bias in High Trait Anxiety Individuals

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Abstract

Bycombining binocular suppression technique and a probe detection paradigm, we investigated attentional bias to invisible stimuliand its gender difference in both high trait anxiety (HTA) andlow trait anxiety (LTA) individuals. As an attentional cue, happy or fearful face pictures were presented to HTAs and LTAs for 800 ms either consciously or unconsciously (through binocular suppression). Participants were asked to judge the orientation of a gabor patch following the face pictures. Their performance was used to measure attentional effect induced by the cue. We found gender differences of attentional effect only in the unconsciouscondition with HTAs. Female HTAs exhibited difficulty in disengaging attentionfromthe location where fearful faces werepresented, while male HTAs showedattentional avoidance of it. Our results suggested that the failure to find attentional avoidance of threateningstimuli in many previous studies might be attributed toconsciouslypresentedstimuliand data analysis regardless of participants' gender.These findings also contributed to our understanding of gender difference in anxiety disorder.

Introduction

G (GAD)

2.

C H A

3,4. 5,6

7.

M B 8 H A

9.

10

I

/ . A ( ) /

. F

(. . 500),

5,11,12 .

. H

(. 1250 1500),

H A L A 5,12 .

M B 8

13 . F

H A

14

16 . H

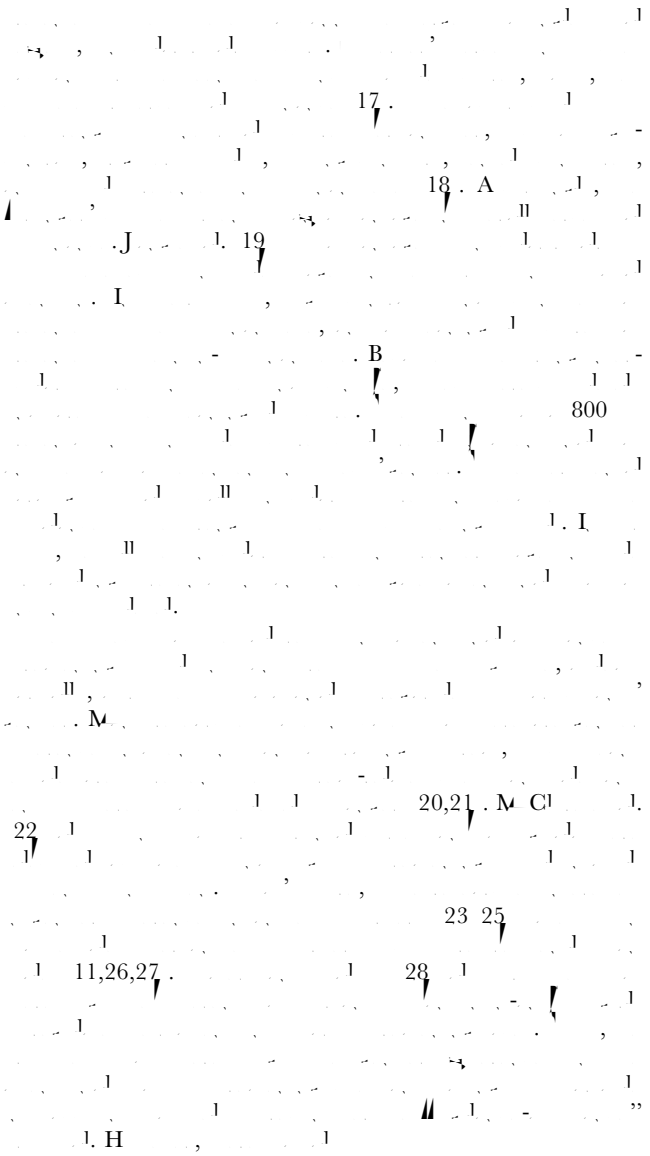

Figure 1. A sample stimulus in the invisible condition. The left image was presented to the non-dominant eye and the right image was presented to the dominant eye.
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(F 2). 256),), , 64 B , 50

Design. F ( ). ( ). ( ) ( ).

J . (2006) 19. A A

Results

Visible condition. A H A L A F 3. A 2×2×2 AE A, (H A/L A) (/) × $(F(1, 44) = 3.75, p = 0.059)$,

Invisible condition. A H A L A F 4. A 2 ( )×2 ( )×2 ( ) AE A $(F(1, 44) = 6.59, p = 0.014)$, $(F(1, 44) = 4.77, p = 0.034)$,

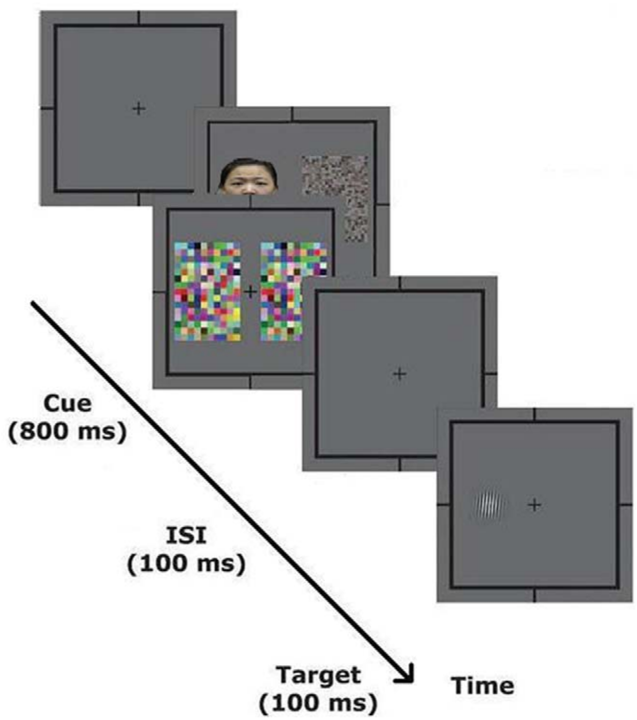

Figure 2. A schematic description of the experimental procedure in the invisible condition.
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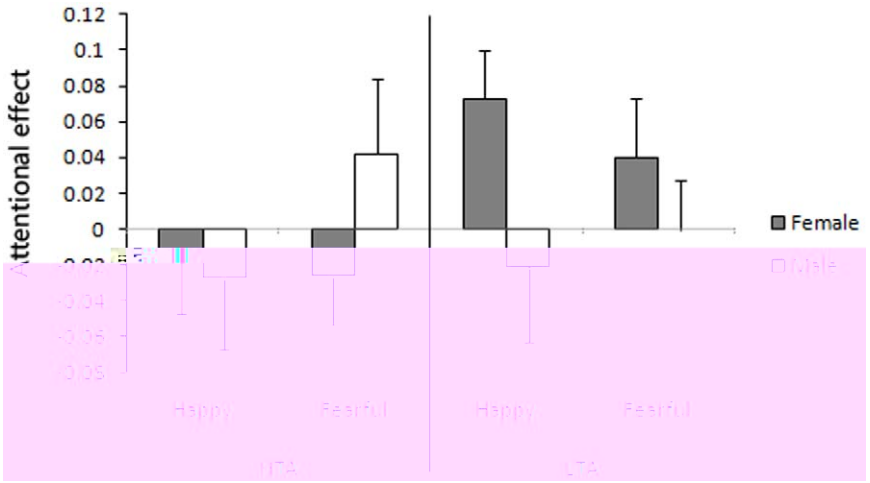

Figure 3. Attention bias and avoidance by happy and fearful faces in the visible condition. The results indicated no significant main effect or interaction. Error bars denote 1 SEM calculated across subjects.
doi:10.1371/journal.pone.0020305.g003

2 ( ) 2 ( ) A A H A L A H A (F (1, 22) = 5.35, = 0.031), L A (F (1, 22) = 1.89, = 0.183). I , H A (F (1, 22) = 4.11, = 0.055). A H A ((11) = 2.66, = 0.022). I H A ((11) = 2.01, = 0.069).

Experiment 2

I E 1, ( ) H A . I (12). H , 2 ( ) 2 ( ) A A H A L A H A (F (1, 22) = 5.35, = 0.031), L A (F (1, 22) = 1.89, = 0.183). I , H A (F (1, 22) = 4.11, = 0.055). A H A ((11) = 2.66, = 0.022). I H A ((11) = 2.01, = 0.069).

Methods

Participant. 120 18 H A 18 H A 19 26 AI- AI 2.

Stimuli and Procedure. E C A (CA) 34 E 1.

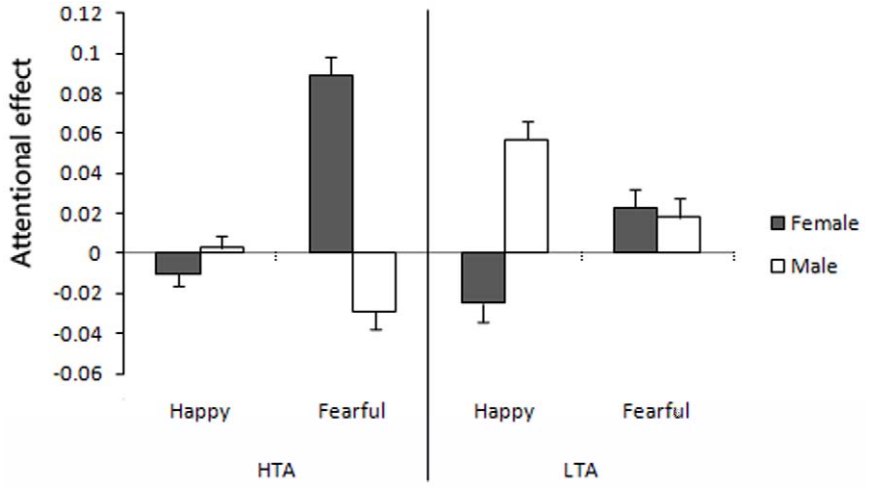

Figure 4. Attention bias and avoidance by happy and fearful faces in the invisible condition. The results indicated a gender difference of attentional effect induced by emotional pictures. And the 3lculTJ5o.3(aifference)-247.3(ef)-345.3(Ittentional)-237.3(effect)-24184(was)-343.95dependen13.2(ne)-2416(n)

Table 2. STAI-TAI scores of female and male participants in HTA group and T-Test between two genders.

	Female	Male	t	P
HTA	52.83(9.77)	52.83(6.64)	0.00	1.00

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Design. A - (.). - (. .) (.). D .

Results

A , H A F 5. A 2 (/)×3 (/ /) - AE A . E . I (F (2, 33) = 5.6, = 0.008), (F (1, 34) = 8.62, = 0.006). A - , ((17) = 2.89, = 0.01), ((17) = −3.75, = 0.002). H A . A , (F 5).

Discussion

, H A . - . , H A , H A . E

L A , C 5,12,35 , H A 800 , 1250 1500 - ” M B (1998). , - . I , H A , . 7,8,36 . F , 8 , 37 . H A . . I , - . (. 200 300 , 38), 800 - H A 39 . , 40 . . M L H 41 , . , .

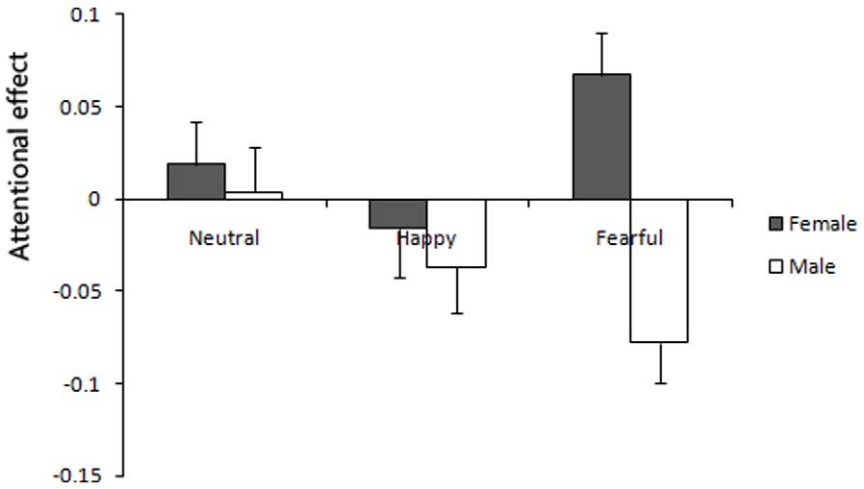

Figure 5. Attention bias and avoidance by neutral, happy and fearful faces in the invisible condition. Female participants exhibited attentional bias to fearful faces, while male participants exhibited attentional avoidance of fearful faces. This result supported that there was gender difference in HTA population. Additionally, we did not find attentional effects by both neutral and happy faces. Error bars denote 1 SEM calculated across subjects.
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H A ... 8,42,43 ... C ... 44 ... H A ... L A ... I ...

K ... Bl ... 45). ... 19. I ... F ... I ...

Author Contributions

C ... J FF. ... J M G. A ... J M. C ... J M. ... J M FF.

References

1. A ... A (1994) ... D ... M ... M ... D (D M-I). ... A ... A ... 204.
2. G EA (1996) E ... A ... Cl ... 16: 729 773.
3. B A, E G, G ... L (1985) A ... E ... B B.
4. ... JMG, ... FE, M L CM, M A (1988) C ... C ...
5. B B, M K, F J, H L (1998) A ... C E 12: 737 753.
6. M K, B B (1999) ... C E 13: 713 740.
7. K EH, ... B, C G, D (2005) ... B 43: 1087 1098.
8. M K, B B (1998) A ... B 36: 809 848.
9. ... (1998) A ... H ...
10. M L C, M A, ... (1986) A ... J A ... 95: 15 20.
11. B D, B M (1988) A ... C E 2: 165 183.
12. M K, B B, M F, D (2004) ... C E 18: 689 700.
13. M B, M H (1999) ... Cl ... 19: 571 590.
14. M K, B B, ... M A (1993) ... J A ... 102: 304 311.
15. M K, B B, M E, J (1995) A ... B ... 33: 927 935.
16. ... I, M (2005) E ... I D 38: 785 795.
17. Bl ... L ... EK (2002) ... E E 3: 13 21.
18. F F, H (2005) C ... E E 8: 1380 1385.
19. J ... C ... F F, H M, H (2006) A ... EA 103: 17048 17052.
20. G LM, ... I (2002) ... J E ... B 26: 27 41.
21. M Cl EB (2000) A ... B 126: 424 453.
22. M Cl EB, M C, E ... EE, ... E, L E, ... (2004) A ... B ... 55: 1047 1055.
23. B MHJ (1996) A ... A Cl ... 16: 129 146.
24. F M, A ... F H, G (1996) G ... B ... 34: 33 39.
25. C DJ, D A, M IM (1995) G ... A E J 29: 114 117.
26. B E, L, E (1995) ... 58: 1 12.
27. ... M, E (2003) A ... ? J A D 77: 197 202.
28. ... AM, J (2009) A ... A ... J B E 40: 206 316.
29. ... LC, C M, E E, -B A, C J (2003) ... I D 34: 831 844.
30. J B, L L, C (2005) I ... ? I D 39: 1373 1382.
31. ... M, ... D C, C ... M, C (2005) ... E 377: 115 120.
32. ... CD, G L, L ... J GA (1983) M ... A ... CA: C ...
33. ... (1993) ... C ... (C). C J Cl 17: 60 62.
34. B L, M H, H ... L J (2005) D E C A ... -A 46 C ... C M H J 19: 719 722.
35. M K, B B, B J, M (1997) ... B ... 35: 297 303.
36. E C, C G (1999) ... B 125: 356 366.
37. E ... MA, ... AE, J, CD (2002) ... 39: 723 732.
38. K E (1995) E ... I: K M, DE, ... C ... MA: MI ... 215 265.
39. K EH, C G, B, D H J (2004) ... B ... 42: 1183 1192.
40. M L C, A E (2009) B ... ? A ... Cl ... 29: 496 505.

41. M L C, H (1992) I 30: 151 161.
42. M A, M L C (1994) C A 45: 25 40.
43. JM G, FE, M L C, M A (1997) C (2 .). C , K:
44. K C, E (2006) A C 11: 16 22.
45. K C, B (2005) C 9: 381 388.