

Gray matter volume of the anterior insular cortex and social networking

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Abstract

Insular cortex (IC) is a key region for social networking. We investigated the relationship between gray matter volume (GMV) of the anterior insular cortex (AIC) and social networking in two groups of healthy young adults (NY, n = 50, Beijing, n = 100). Social networking was measured using the Social Networking Index (SNI). AIC GMV was significantly correlated with SNI in both groups. The correlation was stronger in the NY group than in the Beijing group. These findings suggest that AIC GMV is associated with social networking in healthy young adults, and this relationship may be stronger in those with higher social networking.

KEYWORDS

anterior insular cortex, gray matter volume, social networking, healthy young adults

1 | INTRODUCTION

A ... (C, J, & K, 2008).
 C ... (S & D, 2007).
 L ... (D, 1998). T ... (B, 2013).
 (B, 2012). A ... (GMV) ... (L & B, 2006), ... (A, 2010) ... (G, 2018), ... (L & B, 2006; B, W, D, D, & B, 2011; B, H, B, & D, 2012). H ... (D, 2012). T ... (F, 2011; V, 2014; H, V, & O, 2014; F & B, 2017). T GMV ... (K, B, R, & R, 2012; L, R, B, R, & D, 2011; S, 2011).
 A ... (...)
 ... I ... (F, 2011, 2014; W, 2017) ... S ... (AIC),
 ... (C, I, D, M, & L, 2003; C, 2009; S, C, & P, 2009). F ... (C, C, B, & R, 2000; C & C, 2009; M & U, 2010), ... (A, 2010). S

AIC ... (J, W, & C, 2010), ... (G, 2012), ... (C, 2016). AIC ... (, M & U, 2010; F, 2014)
 ... A ... AIC
 ... (C, 2009). R ... AIC,
 ... (M, M, & P, 1981; C, G, R, & M-P, 2010; R, L, G, L, & F, 2010; C, 2012), ... (E, 2009; C, 2011; T, H, D, & B, 2012; G, 2017), ... (F, 1999; S & D'E, 2015; T, S, & K, 2016). A ... AIC
 (F, 2011; G, 2012; G, H, F, & F, 2013; T, 2016), ... AIC
 B ... AIC
 ... AIC
 ... (MRI)
 ... N Y ... B ... AIC
 ... T ... (SNI) (C, D, S, R, & G, 1997). W
 AIC ... SNI

2 | METHODS

2.1 | Participants

F N Y, 50 (25, 25; = 26.3, SD = 4.0, 19-37)
 I ... : ... (...)
 ... P ... S ... C ... I ... (RRID:SCR_003682)
 DSM-IV (A ... P ... A, 2000), ...) A

. W
 . T I R B
 C U N Y I S M M
 S
 F B , 100 (50 , 50 ;
 = 21.9, SD = 2.67, 18-29)
 . A (),
 . P
 H S R C P U A -
 1964 D H

2.2 | MRI acquisition

...F... SNI...
 ...T... IQ... N Y...
 SNI... 12... (V... F... W... S... S...)
 (... , ... , ...)... W... A... I... S... (WAIS) (W... , 2014). W...
 1... SNI... IQ...
 ...N... N Y...
 ...0 12...
 ...T...
 ...12...
 N... (... 0 8, ... 4 ...
 ...T...
 " ... " R ...
 " ... " (... B S ...) . T " ... "
 D ...
 ...R... N Y ... 82.41%
 (... SNI ...) 12.03%
 5.56% ... B ...
 ...F...
 (0.94), ... (0.91), ... SNI ...
 ... (0.88). T ...
 C ... ' α , 0.89, ... SNI ...
 (... ' α ... 0.53).
 F B ... , ... N Y ...
 (... S ... , ...
 (... SNI ...)
 83.83% ... 13.14%
 ... 3.03% ... F ...
 ... (0.96), ... (0.93),
 ... (0.85). T ... SNI ...
 R ... SNI ... N Y ... C ...
 α , 0.90 ...
 (C ... ' α ... 0.60). G ...

2.6 | Correlation and regression analyses

F VBM, GMV ... (GLM)
 ... SNI ...
 ... A ... 0.1
 ... T GLM ... GMV
 AIC ... A ... GLM GMV
 ... SNI ... CSF ...
 ... GLM ...
 SNI ... A GLM GMV ...
 (...) ... SNI ...
 SNI ... SNI ...
 GMV ... AIC ... G ...
 ... GLM ...
 p .05 ... ROI AIC ...
 ... (k) ...
 ... p .05. T ...
 ... T ... k ...
 ... N ...
 (RRID:SCR_005656; ...://N ...),
 ... AIC ... (L , H ... , Y ...
 L , & N ... , 2013). B ...
 ... GMV ...
 AIC ... MNI_ICBM152 ... (F ... , E ... ,
 M K ... , A ... , & C ... , 2009). T ...
 ... (P. R. ... GLM ...
 H.), ... A S ...
 ... T k ... / / / / / ... /A S ...),
 (... :// ... / / / / ... /A S ...),
 ... E ...
 ... GLM ...
 ... GMV ROI ...
 ... SNI ... F ...
 ... FWE ... p .05

T
ROI
GMV-SNI
T ROI
AIC
AIC
SNI, ROI
AIC,
SNI . H
ROI,
GMV AIC
SNI. F ROI,
GMV

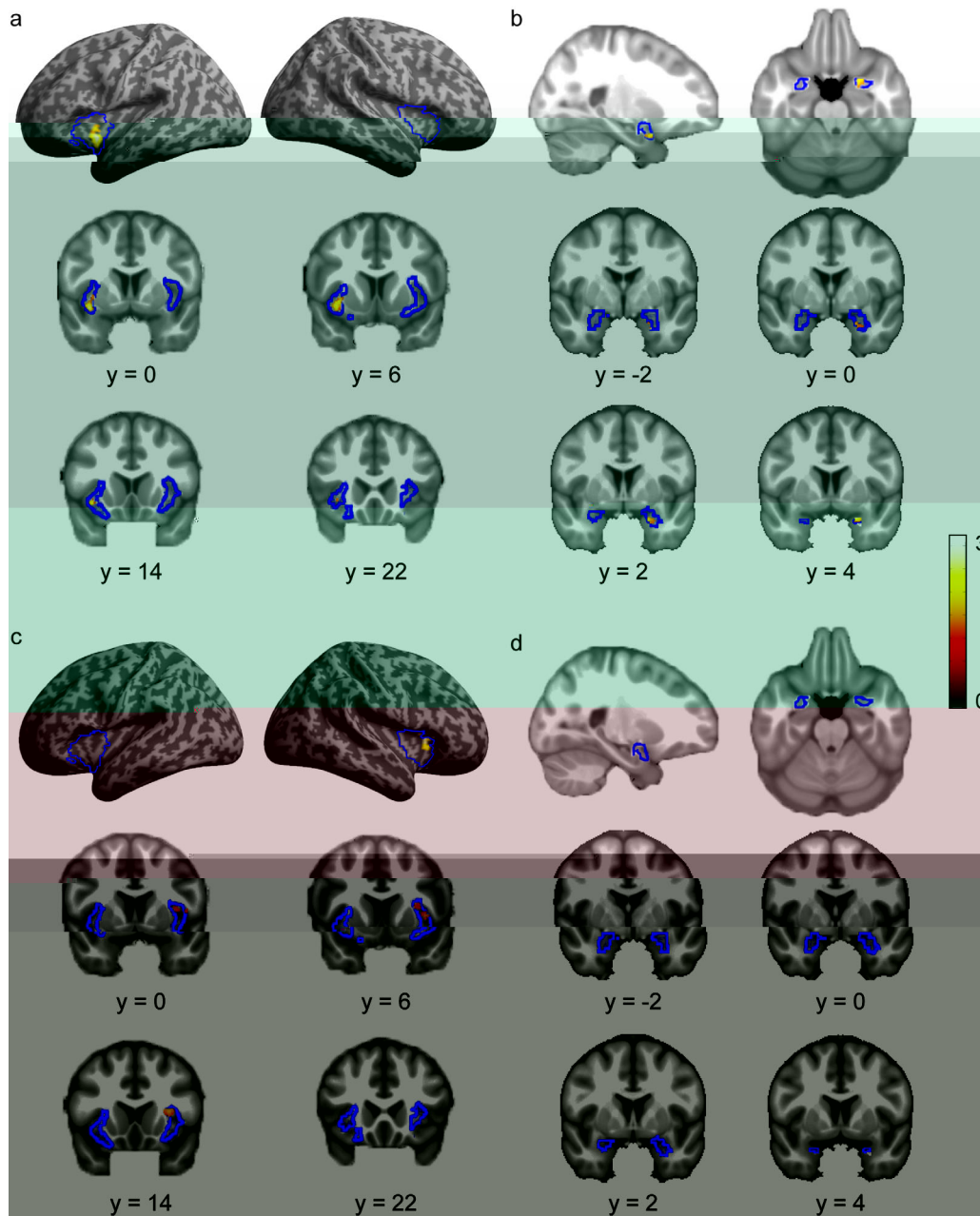


FIGURE 1 R () AIC () B () AIC () () B () AIC () GMV SNI () N Y AIC ()

(B (), 2013) (S (), 2008) (B (), 2013). (S (), S (), & C (), 2014). A (K (), G (), & B (), 2016), (H (), 2014). T AIC,

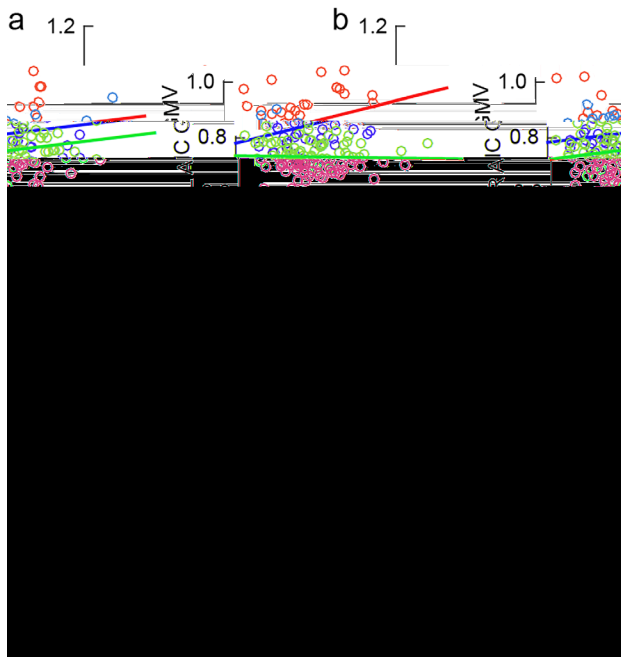


FIGURE 3 Scatter plots showing AIC GMV-SNI for two conditions (a and b).

() () AIC GMV-SNI
 () () GMV-SNI
 : C : N Y : C
 : B [C
]
 AIC
 (F , 2011; G
 , 2013),
 (G , 2013). F
 AIC
 (S & L , 2009; L & S , 2010). T
 AIC
 AIC.
 T AIC
 (CCN) (N ,
 2012; F , 2014; W , 2017)
 (DMN) (R , 2015),
 (M & U , 2010).
 A
 CCN (A , 1999; F & B , 2017) DMN (M ,
 2012),
 . F

AIC
 (VEN),
 AIC
 (A , W , T , & H , 2005; B , S ,
 U , & H , 2013). T
 (C , S , & C , 2014; O , 2016;
 S , 2017)
 AIC
 . A
 CCN DMN
 AIC
 (,)
 (F , 2014; F , 2014; W , 2017),
 (M & U , 2010; F H , R ,
 K , S , & P , 2015).
 I
 (A ,
 2010; L , 2011; S , 2011; B , H ,
 B , & D , 2012 ; K , 2012). I
 AIC,
 (F , 2014; W , 2017),
 (B & M ,
 2010; O , 2016). B
 AIC,
 SNI . A
 (R , 2017; S
 & F , 2017),
 (L
 , 2011),
 T
 ROI SNI
 AIC
 B
 N Y
 E
 (C , 2008; H & N , 2008),
 (individualist)
 collectivist (T , 1990, 1994)
 C
 (M , D , H , & M , 2000). N ,
 N Y B
 AIC
 SNI (, H ,
 GMV - SNI N Y

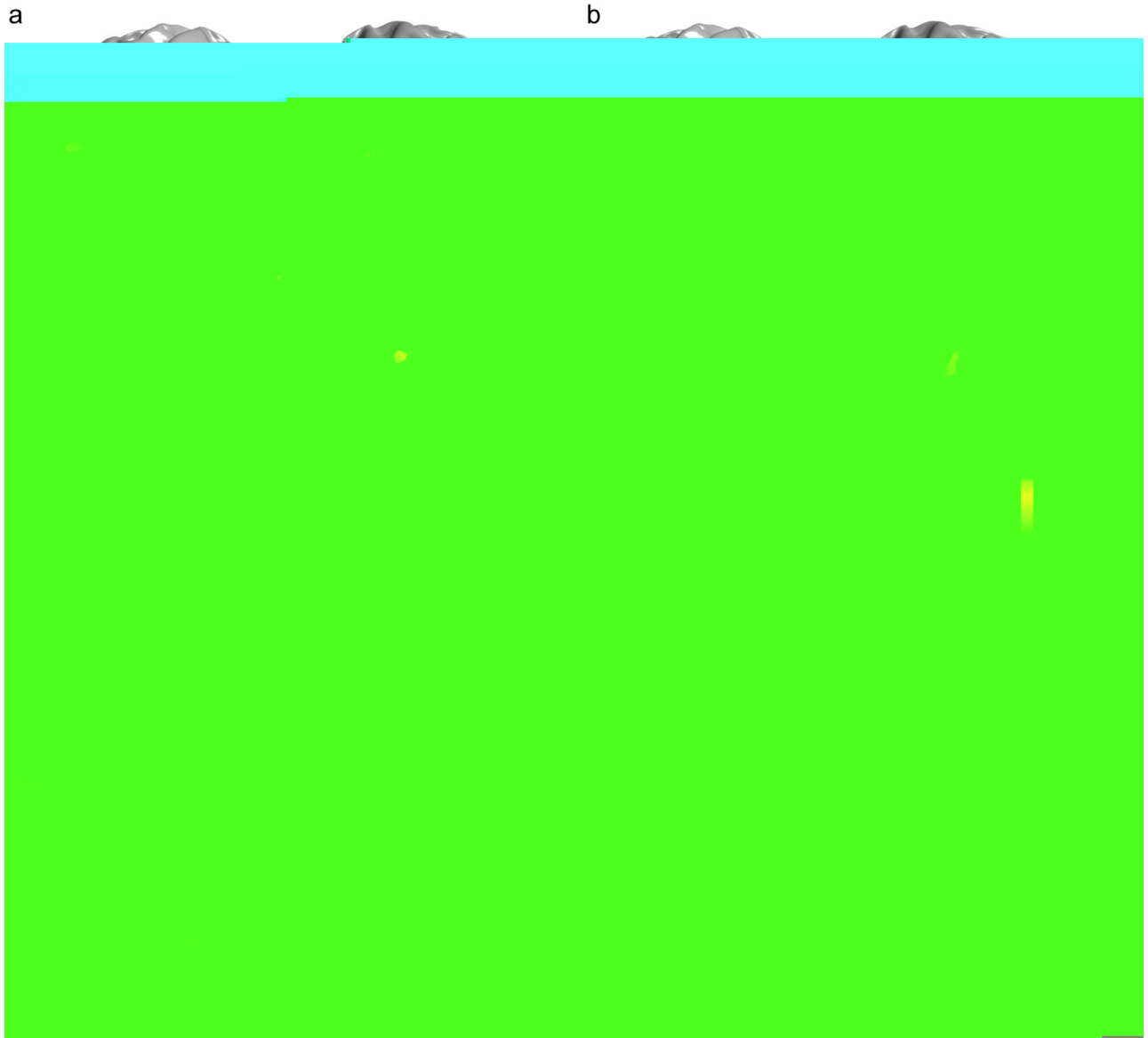


FIGURE 4

AIC (Akaike Information Criterion) and GMV - SNI (Global Minimum Variance - Signal-to-Noise Index) are used to evaluate the performance of different models. The AIC is a measure of the relative quality of a statistical model for a given dataset, and the GMV - SNI is a measure of the signal-to-noise ratio in a system. The AIC is calculated as $AIC = -2 \ln(L) + 2k$, where L is the likelihood function and k is the number of parameters in the model. The GMV - SNI is calculated as $GMV - SNI = \frac{GMV}{SNI}$, where GMV is the Global Minimum Variance and SNI is the Signal-to-Noise Index. The AIC and GMV - SNI are used to compare different models and to select the best model for a given dataset. The AIC is used to compare models with different numbers of parameters, and the GMV - SNI is used to compare models with different signal-to-noise ratios. The AIC and GMV - SNI are used to evaluate the performance of different models in a variety of applications, including signal processing, machine learning, and statistics. The AIC and GMV - SNI are used to compare different models and to select the best model for a given dataset. The AIC is used to compare models with different numbers of parameters, and the GMV - SNI is used to compare models with different signal-to-noise ratios. The AIC and GMV - SNI are used to evaluate the performance of different models in a variety of applications, including signal processing, machine learning, and statistics.

... S... N
I ... SNI.

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C ... JF ... EEC,
... D. G ... P ... S ...

CONFLICT OF INTEREST

T ...

AUTHOR CONTRIBUTIONS

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... A.D., Q.W., T.W., ... Z.W.
... J.F., A.S., A.D., J.F., P.R.H., Q.W., T.W., E.C., T.N.,
... Y.W.

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