supplementary methods and results

Sociocultural patterning of neural activity during self-reflection

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Imaging Analysis

Sample size analysis

The sample size analysis was conducted to estimate how many subjects from each cultural group were required to reveal reliable cultural differences in mPFC/TPJ activity during self-reflection in the current study. To do this, we first randomly selected the same number of participants (group size n=2 to 29) from each cultural group and this resulted in 28 data sets for each cultural group. Two-sample t-tests on the contrast values of TPJ and mPFC activity (self- vs. public-figure-judgments in social blocks) were then conducted for two data sets with the same number of participants. The whole procedure including generating data sets and two-sample t-test was repeated 100 times for each group size and the mean t-value was calculated. We identified the group size at which every calculations resulted in an absolute t-value that is larger than the critical t-value for 95% confidence for that group size.

Psychophysiological interaction (PPI) analysis

A PPI analysis (Friston et al., 1997) was used to estimate increased covariation between different brain regions during a specific task. In our study the coordinates of the peak voxel in the mPFC shown in the contrasts of self- vs. public-figure-judgments of mental, social, or physical attributes were respectively used to serve as a landmark for the individual seed voxels to identify brain regions that showed significantly increased functional connectivity with the mPFC. The ROI in each individual participant was defined as a sphere with 5 mm radius centered at the peak voxel in the mPFC. The time series of each ROI were then extracted, and the PPI regressor was calculated as the element-by-element product of the mean-corrected activity of this ROI and a vector coding for differential task effects of self- vs. public-figure-judgments. The PPI regressors reflected the interaction between psychological variable (self- vs. public-figure-judgment) and the time course of mPFC activation. The individual contrast images reflecting the effects of the PPI between the mPFC and other brain areas were subsequently subjected to one-sample t-tests. The results of the group analysis identified brain regions in which the activity systematically showed increased correlations with mPFC activity during self- compared to public-figure-judgments. Two-sample t-tests were then calculated to identify if the functional connectivity between mPFC and TPJ was stronger in Chinese participants than in Danish participants. As we had a priori hypothesis for the functional connectivity between the mPFC and TPJ, a liberal threshold ($p < 0.001$ uncorrected and a spatial extent =100) was used to identify brain areas that showed significant functional connectivity with the seed ROI in the mPFC.

Discriminant analysis

BOLD signals from specific brain areas have been used to categorize the contents of an individual's perception (Kay et al., 2008), the outcomes of a person's decision making (Soon et al., 2008), and to classify persons into different religious groups (Ge et al., 2009). We used similar methods to assess whether specific patterns of neural activity in different brain regions associated with self-reflection of social attributes could classify participants into Chinese and Danish groups with a higher than chance level accuracy. To do this, we first created a featured vector for each participant with the contrast values of mPFC and right TPJ activity associated with self- versus public-figure-judgments in the social block. A linear discriminant function was then constructed based on the vector from a sample consisting of both Chinese and Danish participants. The optimal weight and bias of the linear discriminant function were calculated using the Fisher discriminant function (Duda and Hart, 1973; Cawley and Talbot, 2003). We employed the *leave-one-out* cross-validation, i.e., one case was left out of the training set and then used as a test set. The discriminant function was then used to assess which cultural group the "leave-out" individual subject is associated with. Repeating this procedure for all the cases in the data set estimated the generalization accuracy of the method. The accuracy of such classification analysis helps to validate the conclusion of socioculturally patterns of neural activity in different brain regions (i.e., mPFC and TPJ) since the classification analysis reduced any bias produced by precategorization of participants in terms of cultural group.

Mediation analysis

Mediation analysis was performed to examine if individuals' interdependence mediated the difference in mPFC/TPJ activity between Chinese and Danes. We chose a classic approach to establish mediation (Judd and Kenny, 1981; Baron and Kenny, 1986). Three different regression models were constructed, as shown below:

$$Y = \beta_{11} X + \beta_{10} \quad (1)$$

$$Mediator = \beta_{21} X + \beta_{20} \quad (2)$$

$$Y = \beta_{31} X + \beta_{32} Mediator + \beta_{30} \quad (3)$$

Four conditions for establishing mediation are: (a) in Equation 1, the independent variable (group) must predict the dependent variable (neural responses in mPFC or TPJ), β_{11} is significant; (b) in Equation 2, the independent variable (group) must predict the mediator (interdependence), β_{21} is significant; (c) in Equation 3, when regressing the dependent variable (neural responses in mPFC or TPJ) onto the mediator (interdependence) and the independent variable (group), the mediator must predict the dependent variable (neural responses in mPFC or TPJ), β_{32} is significant; and (d) in Equation 3, the effects of the independent variable (group) on the dependent variable (neural responses in mPFC or TPJ) must be reduced or even eliminated, $\beta_{31}<\beta_{11}$ (in absolute value, partial mediation) or β_{31} is insignificant (full mediation). The Sobel test (Sobel, 1982) was conducted to further confirm the significance of the mediator.

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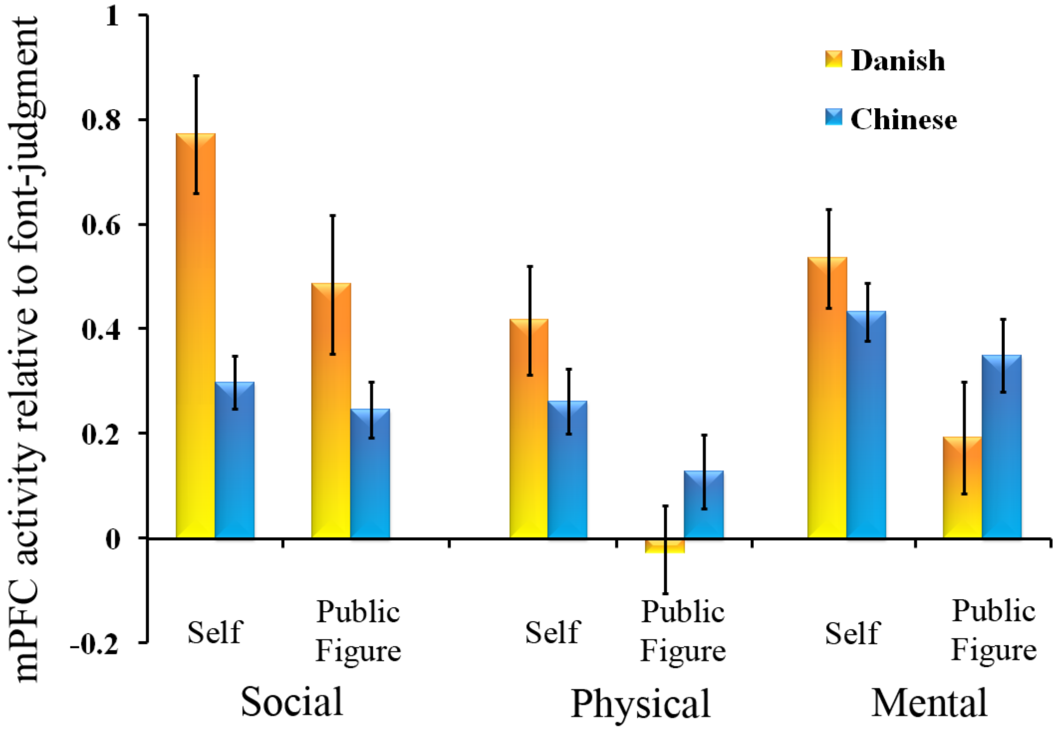

Figure S1. mPFC activity to self- and public-figure-judgments relative to font-judgments in social, physical and mental blocks.

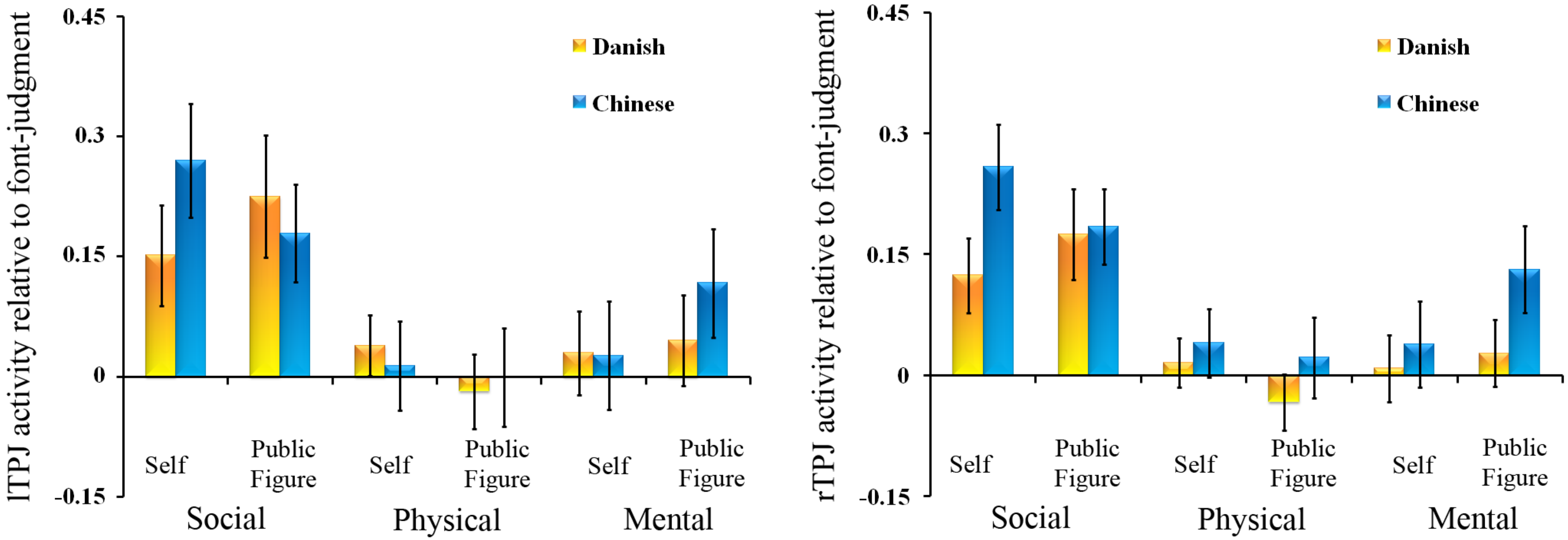

Figure S2. Activity in the left and right TPJ to self- and public-figure-judgments relative to font-judgments in social, physical and mental blocks.

Table S1 Complete Sets of Items Used in the Current Study

Social roles

Asian	poor man	fan	landlord	high school student
American	scout leader	European	middle class	college student
Customer	ads spokesman	idol	African	cellphone manufacturer
buddhist	non-religious	professor	salesman	technical worker
Emcee	undergraduate	athlete	bank customer	religious person
Coach	house owner	Christian	student	teacher assistant
Researcher	left-winger	volunteer	teacher	olympic champion
Politician	shop assistant	civilian	cyclist	graduate student
Chinese	actor/actress	humanist	testee	mathematician
Korean	Arts student	Danish	PC user	white collar workers
Driver	museum owner	bus driver	gmail user	blue collar workers
car owner	Mac user	German	internet user	government employee
skier	right-winger	passenger	facebook user	bank employee
tourist	bus passenger	tenant	football player	table tennis player
celebrity	bike owner	scout	cellphone user	basketball player
tour guide	waitor/waitress	consumer	self-employed	not a celebrity

Mental traits

Decent	tolerant	assertive	confident	lazy
honest	Humble	picky	suspicious	easy-going
witty	calm	Timid	healthy	mediocre
indifferent	rash	rough	Friendly	rude
outgoing	merciless	diligent	talkative	Smart
hostile	despicable	competent	arrogant	headstrong
Clever	reliable	gregarious	dexterous	shy
Aggressive	Generous	firm	outstanding	open-minded
Slow	easy-going	Petty	rigid	intelligent
snobbish	fiery	earnest	Irritable	strong
hospitable	pessimistic	negative	rational	Frank
loyal	arbitrary	humorous	naughty	stubborn
careless	famous	warm	superstitious	hypocritical
sincere	happy	selfish	courageous	disgusting
stupid	clumsy	modest	weak	dedicated
optimistic	mature	greedy	patient	impulsive

Physical attributes

short	long hair	flawless	short fingers	stocky arms
straight hair	with no acne	fat	thin-lipped	heavier than 60 kg
thin arms	small eyes	wrinkled	broad shoulder	some acnes on the face

hyperopia	bald-headed	thin	small feet	asymmetrical face
big feet	flat-chested	buxom	thick-lipped	lighter than 60 kg
black hair	tufty-haired	tall	yellow hair	symmetrical face
choppy	pierced ears	myopia	small ears	narrow shoulder
big ears	unpierced ears	slim	yellowish skin	small hand
long arm	straight nose	tattoo	big nose	hour-glass figure
short neck	large eyes	long neck	tallow-faced	long eyelashes
green eyes	buxom body	no tattoo	bushy eyebrows	snaggle-toothed
blue pupil	straight teeth	small nose	boney body	long fingers
no freckles	out of shape	thin legs	short arm	ruddy faced
large waist	thick-legged	in shape	sparse eyebrows	short eyelashes
freckles	crooked nose	oval face	moon-faced	curly hair
short legs	short hair	big hand	long legs	light skin

Table S2 Mean Ratio of 'Yes' Responses and Reaction Times (SD) to Judgment Tasks during Scanning

	Chinese	Danish
Ratio of 'Yes' responses (%)		
Social self	43.1 (14.0)	45.7 (22.6)
Social public figure	45.3 (9.0)	44.6 (17.5)
Physical self	42.6 (11.2)	43.3 (11.6)
Physical public figure	42.7 (7.5)	44.9 (12.3)
Mental self	42.9 (9.4)	44.0 (9.7)
Mental public figure	44.3 (7.4)	44.5 (9.3)
RTs (ms)		
Social self	1017 (143)	1134 (177)
Social public figure	1093 (162)	1206 (195)
Physical self	1293 (202)	1303 (174)
Physical public figure	1252 (191)	1369 (207)
Mental self	1060 (201)	1197 (146)
Mental public figure	1092 (180)	1242 (182)

Table S3 Brain Activations in Chinese and Danish Participants Shown in the Whole Brain Analyses

Group		Region	x/y/z (MNI)	t-value	cluster size
		Contrast of Self- vs. Public-figure-judgments			
Chinese					
	Social	Precuneus (R)	2/-86/34	6.91	639
		Temporoparietal junction (R)	62/-56/30	6.02	466
		Temporoparietal junction (L)	-56/-60/20	4.78	459
		Anterior Cingulate (R)	8/30/4	4.35	242
	Mental	Anterior cingulate (L)	-2/34/22	7.10	2006
		Medial prefrontal Cortex (L)	4/24/40	5.36	
		Left frontal (L)	-24/42/38	5.78	
	Physical	Left frontal (L)	-24/46/36	5.85	287
		Anterior cingulate (L)	-6/26/24	3.98	413
		Medial prefrontal Cortex (L)	-6/50/12	3.90	
		Posterior cingulate (L)	-4/-64/54	4.60	332
Danish					
	Social	Anterior cingulate (L)	-4/34/4	6.49	1447
		Medial prefrontal Cortex (L)	-4/46/14	5.53	
	Mental	Anterior cingulate (L)	-4/34/0	8.60	3253
		Medial prefrontal Cortex (L)	-2/44/10	7.97	
		Caudate nuclues (R)	18/6/10	6.85	439
		Thalamus (L)	-2/-16/10	6.35	954
	Physical	Medial prefrontal Cortex (L)	-4/48/8	8.79	2154
		Anterior cingulate (R)	2/36/8	8.60	
		Conjunction of contrasts of Public-figure- vs. Font-judgments across three dimensions			
Chinese					
		Superior frontal cortex (L)	-10/46/42	13.40	1456
		Posterial cingulate (L)	-10/-54/32	13.01	2325
		Inferior frontal cortex (L)	-42/28/-6	12.77	5426
		Inferior frontal cortex (R)	36/-12/-18	8.69	358
		Caudate (R)	26/4/6	7.16	329
		Cerebellum (R)	26/-84/-30	11.92	226
		Cerebellum (R)	4/-54/-48	7.07	119
		Insula (R)	34/-26/18	6.07	129

	Middle cingulate (R)	12/8/42	5.84	127
Danish				
	Superior frontal cortex (L)	-4/12/60	13.75	3348
	Posterial cingulate (L)	-6/-56/26	9.15	828
	Inferior frontal cortex (L)	-44/18/-2	11.57	1976
	Caudate (R)	14/2/16	7.57	242
	Cerebellum (R)	30/-78/-36	7.84	374
	Cerebellum (R)	6/-58/-44	7.13	101
	Thalamus (L)	-6/-18/14	10.89	653

Table S4 Brain Regions with Stronger Functional Connectivity with the mPFC Associated with Self-reflection of Social Attributes in Chinese than in Danish Participants

Region	**x/y/z (MNI)**	**t-value**	**cluster-size**
Occipital	8/-76/-4	5.33	632
	-12/-82/-8	3.97	
Superior parietal (R)	30/-56/66	5.03	461
	42/-34/64	4.27	
Dorsal Medial prefrontal Cortex (L)	4/46/30	4.33	424
	14/58/26	4.24	
Occipital (L)	-14/-94/6	3.93	160
	-28/-90/14	3.64	
Temporoparietal junction (R)	54/-42/38	3.79	187
	56/-52/36	3.61	
Temporoparietal junction (L)	-56/-50/34	3.60	130
	-60/-40/30	3.56	