<center>**Supplemental Materials**</center>

S1. Supplemental Method

S1.1. Linear Mixed-Effects Model

The coefficient per voxel over each block of the task for each participant was considered a product of the following equation:

$$\beta = \beta_{0j} + \beta_{1j}*question + \beta_{2j}*block + \beta_{3j}*RSA + \beta_{4j}* SC\ \beta_{5j}*(RSA \times question) + \beta_{6j}*(SC \times question)$$

where β is the coefficient of the hemodynamic response function for that block for that participant, β_{0j} is the random intercept for each participant, β_{1j} is the within-subject effect of the question, β_{2j} is the within-subject effect of block, β_{3j} is the within-subject effect of RSA, β_{4j} is the within-subject effect of SC, β_{5j} is the RSA x question interaction, and β_{6j} is the SC x question interaction

Code

```
3dLME -prefix FacesPhysio -jobs 10 \
-model 'block+question*(SCRc+RSAc)' \
-qVars block, SCRc, RSAc \
-ranEff ~1 \
-SS_type 3 \
-num_glt 5 \
-gltLabel 1 rsaMain -gltCode 1 RSAc : \
-gltLabel 2 scrMain -gltCode 2 SCRc : \
-gltLabel 3 questionMain -gltCode 3 question : "1*S" "-1*W" \
-gltLabel 4 questionxRSA -gltCode 4 question : "1*S" "-1*W" RSAc : \
-gltLabel 5 questionxSCR -gltCode 5 question : "1*S" "-1*W" SCRc : \
-dataTable \
Subj    block   question        SCRc    RSAc    InputFile \
.
.
.
```

S1.2. Example MPlus Code

title:
Effect of hippocampus-autonomic coupling on baseline autonomic activity

data:
FILE = faces.physio.allbrain0.complete.030718.csv;

variable:
names are
SID   block wide SCRc RSAc vmPFCc dmPFCc
PCCc   Lhipc   dmPFC1c dmPFC2c
RMTGc RIPLc SCRb RSAb;

! The same code was used to test for associations using other brain regions   !
! e.g. for vmPFC-RSA coupling, just replace Lhipc with vmPFC, SCRc with RSAc,!
! and SCRb with RSAb   !

USEVARIABLES =
block SCRc Lhipc SCRb;
within = block SCRc Lhipc;
between = SCRb;

CLUSTER = SID;

MISSING = .;

ANALYSIS:
coverage = 0;
TYPE = TWOLEVEL RANDOM;
ESTIMATOR = ML;

MODEL:

%WITHIN%

!Covarying block with all within variables to 'detrend' !

block WITH SCRc Lhipc;

! Random slope representing individual differences in coupling of SCR with left hippocampus!

S | SCRc ON Lhipc;

[SCRc @0 Lhipc @0];

 %BETWEEN%

S; [S];

! Predicting baseline skin conductance outside of the scanner !
! by the strength of coupling during the task in the scanner   !

SCRb ON S;

S2. Supplemental Results

S2.1. Attention-Specific Brain-Autonomic Coupling

There were no significant interactions between the attention condition of the block and RSA in relation to activity in the regions of interest. In whole brain analyses, there were significant interactions between the attention condition of the block and RSA in relation to activity in the left thalamus and left lingual gyrus (Table S2, Figure S1). Left thalamus activity was only positively coupled with RSA during the "How sad" blocks, and not the "How wide" blocks. Activity in the left lingual gyrus was positively coupled with RSA during the "How sad" blocks and negatively coupled with RSA during the "How wide" blocks.

There were no significant interactions between the attention condition of the block and the number of SCRs in relation to activity in the regions of interest. There were significant interactions between the attention condition of the block and number of SCRs in relation to activity in right declive, left superior temporal gyrus, right postcentral gyrus, left fusiform gyrus, and left paracentral gyrus (Table S2, Figure S1). Activity in the right declive, left fusiform, and left paracentral gyrus were positively coupled with the number of SCRs during the "How sad" blocks and negatively coupled with the number of SCRs during the "How wide" blocks. Left superior temporal gyrus activity was only positively coupled with the number of SCRs during the "How wide" blocks, and not the "How sad" blocks. Right postcentral gyrus activity was only negatively coupled with the number of SCRs during the "How wide" blocks, and not the "How sad" blocks.

Table S1: Regions of significant activation difference between question conditions

Voxels	Peak (x, y, z)	Region	BA	Peak voxel t-score
"How Sad does this person make you feel?" > "How wide is the nose?"				
157	-56, -64, 20	Left Superior Temporal Gyrus	39	3.42
"How wide is the nose?" > "How Sad does this person make you feel?"				
1363	28, -72, 58	Right Superior Parietal Lobule	7	4.06
526	-46, -40, 50	Left Inferior Parietal Lobule	40	3.39
306	-22, -70, 52	Left Precuneus	7	3.28
288	-48, -64, -14	Left Middle Occipital Gyrus	37	4.58
99	50, -54, -16	Right Inferior Temporal Gyrus	20	3.74

Peak (x, y, z) = MNI coordinates for the voxel with the highest coefficient within each cluster;

BA = Brodmann's area; $N = 135$, Voxel-wise threshold: $t = 3.280$, $p = 0.001$, Minimum cluster = 90 voxels; alpha <0.05.

Table S2: Regions with significant interactions between autonomic activity and question condition

Voxels	Peak (x, y, z)	Region	BA	Peak voxel t-score
		Question x RSA		
111	-8, -14, 10	Left Thalamus		3.28
108	10, 98, 12	Left Lingual Gyrus	17	4.46
		Question x SCR		
216	36, -72, -24	Right Declive		4.50
187	-30, 18, -42	Left Superior Temporal Gyrus	38	-4.52
172	42, -42, 62	Right Postcentral Gyrus	40	4.97
137	-60, -50, -28	Left Fusiform Gyrus	20	4.51
121	-10, -32, 80	Left Paracentral Gyrus	4	3.45

Peak (x, y, z) = MNI coordinates for the voxel with the highest coefficient within each cluster; BA = Brodmann's area; $N = 135$, Voxel-wise threshold: $t = 3.280$, $p = 0.001$, Minimum cluster = 90 voxels; alpha <0.05.

Figure S1: Brain regions with significant interactions between autonomic activity and question condition
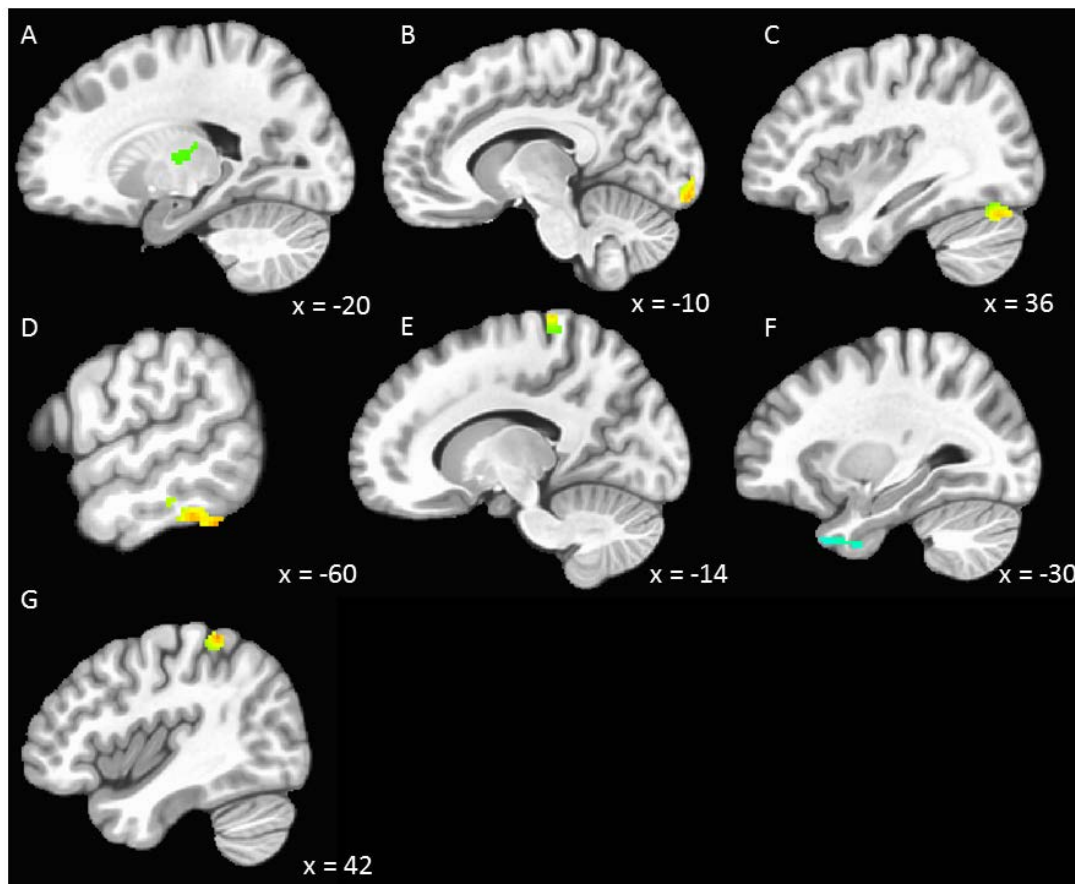

Figure 2: A) Left thalamus activity was only positively coupled with RSA during the "How sad" blocks, and not the "How wide" blocks. B) Activity in the left lingual gyrus was positively coupled with RSA during the "How sad" blocks and negatively coupled with RSA during the "How wide" blocks. Activity in the right declive (C), left fusiform (D), and left paracentral gyrus (E) were positively coupled with the number of SCRs during the "How sad" blocks and negatively coupled with the number of SCRs during the "How wide" blocks. Left superior temporal gyrus activity (F) was only positively coupled with the number of SCRs during the "How wide" blocks, and not the "How sad" blocks. Right postcentral gyrus activity (G) was only negatively coupled with the number of SCRs during the "How wide" blocks, and not the "How sad" blocks.