Supplementary Information

Experiment 1: Additional Methods

Magnetic Resonance Imaging Acquisition. Data were collected on a GE 3T MRI scanner (GE Medical Systems, Milwaukee, Wisconsin). Whole brain anatomical images were acquired using a standard quadrature birdcage headcoil. An axial 3D T1-weighted inversion-recovery fast gradient echo sequence was used (TR = 9.4 msec, TE 2.1 msec, FOV = 14 cm, flip angle = 10°, NEX = 2, matrix = 512 x 512, voxel size = 0.3 mm, 248 slices, slice thickness = 1 mm, slice gap = -0.05 mm, prep time = 600, bandwidth = 15.63, frequency = 256, phase = 224). These scans occurred on separate testing days from PET scanning. Monkeys were anesthetized with 15 mg/kg intramuscular ketamine, as well as 30 µg/kg medetomidine and a booster of 15 mg/kg ketamine immediately before the MRI acquisition. Heart rate and saturation of peripheral oxygen ($Sp0_2$) were monitored during the scan and 150 µg/kg atipamezole was administered post-scan to reverse the effects of medetomidine.

PET Data Acquisition. Prior to the scanning period, each animal was given a mock injection on 5 different days to increase adaptation to the effects of handling. Animals were food-deprived overnight and before their scan. Heart rate, $Sp0_2$, and respiration were monitored during the scan, and body temperature was maintained with a warm-air blanket.

Transformation of PET Data to a Standard Space. To facilitate across-subject comparisons, a multi-step procedure was implemented to transform each PET image into a standard space after the creation of study-specific MRI and PET templates. Each subject's PET scans were coregistered to the first PET scan acquired from that subject using a 6-parameter rigid-body transformation. Each subject's coregistered PET scans were then averaged to create a subject-specific PET template image. Each subject's original PET scans were then coregistered using a 6-parameter rigid-body transformation to match the corresponding subject-specific PET template. Each subject-specific PET template was coregistered to that subject's MRI image in native space using a 6-parameter rigid-body transformation. Each animal's T2-weighted MRI was coregistered using a 6-parameter rigid body transformation to match their T1-weighted MRI. A brain-only mask was manually created based on T1- and T2-weighted MRI images, and independently verified by two researchers. Masked T1-weighted MRI images were then coregistered using a 12-parameter affine transformation to match a rhesus monkey MRI template in a standard space using FSL (1-3). T1-weighted images in standard space were averaged to create a study-specific MRI template. Each brain-extracted T1-image was then transformed to match the study-specific template using a 5th order non-linear transformation as implemented by AIR (4). Transformations were cumulated in order to yield PET images from each subject in the standard-space defined by Paxinos, Huang, and Toga, 2000 (2).

Gray Matter Probability (GMP). Using FSL-fast (5), T1-images in standard space were segmented into probability of gray-matter, white-matter, and cerebrospinal fluid. GMP maps indicated the subject-specific probability of gray matter at each voxel. An identical smoothing kernel (4 mm FWHM) was applied to the GMP maps, to facilitate the statistical co-variation of GMP in tests of FDG uptake.

Additional Results

Experiment 1 -Raw Cortisol. We tested raw cortisol values to confirm findings showing differences in cortisol between conditions when controlling for time of day. Tests of cortisol concentrations following each condition were significantly different, $F(4, 136) = 73.97$, $p <$

.0001. The raw cortisol value following threat conditions was significantly greater than cortisol following home-cage conditions, $t(34) = 4.83$, $p < .001$. Further raw cortisol following home-cage conditions was greater than those observed at the morning baseline, $t(34) = 13.44$, $p < .001$.

Table S1. Experiment 2: Brain Regions that Consistently Predict Cortisol Responses Across Contexts

			Distance Relative to Anterior Commissure		
Local Maxima	Hemisphere	Volume, mm^3	x	y	z
Pontine Reticular Nucleus	Right	264	3	-16	-11
Temporal Area TAa	Right	258	26	-4	-7
Anteroventral Thalamic Nucleus	Midline	181	-1	-4	5
Area 29	Left	116	-5	-19	4
Superior Temporal Gyrus	Left	101	-22	0	-6
Area 25/24	Midline	65	-2	11	6
Temporal Area TE1	Left	27	-18	2	-14
White Matter superior to Caudate Nucleus	Right	17	5	5	11
White Matter superior to Hippocampus	Right	16	15	-15	-3
Entorhinal Cortex	Left	16	-10	-3	-14
Hippocampus	Left	14	-15	-16	-4
External Capsule	Right	9	10	9	3

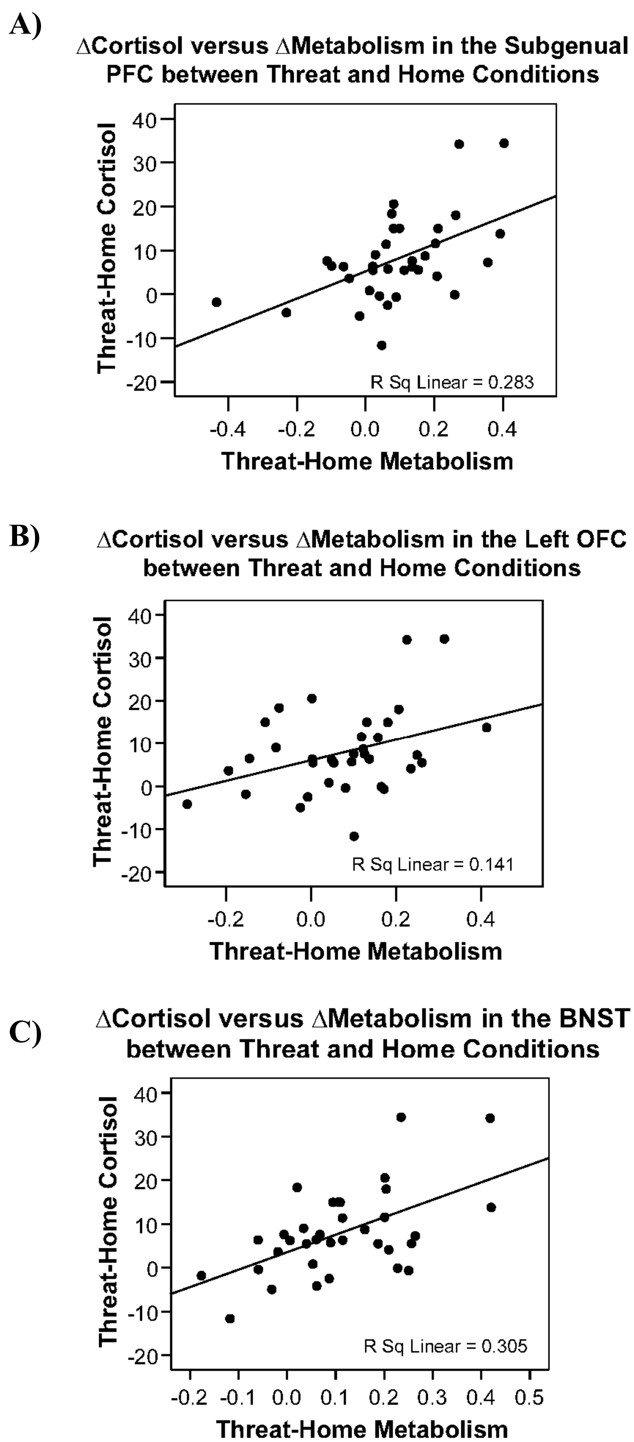

Figure S1. For Experiment 1, we examined the relationship between the change in metabolic activity between threat and home-cage conditions and the change in cortisol between these conditions. We computed difference scores between threat and home-cage cortisol levels (μg/dL) as well as difference scores between threat and home-cage metabolism. This analysis demonstrated that the difference in cortisol levels between threat and home-cage conditions was significantly correlated with the difference in metabolism in the **A)** subgenual PFC ($r[33] = .53$, $p < .001$), **B)** OFC ($r[33] = .38$, $p < .05$), and **C)** BNST/NAC ($r[33] = .55$, $p < .001$).

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