

Image Data Preprocessing

Preprocessing consisted of within-subject realignment, coregistration, segmentation, spatial normalization and spatial smoothing. Functional scans were coregistered to the MPAGE structural image, which was processed using a unified segmentation procedure combining segmentation, bias correction and spatial normalization (1); the same normalization parameters were then used to normalize the EPI images. Finally the EPI images were smoothed with a Gaussian kernel of 8 mm full-width at half-maximum. The canonical hemodynamic response function and its temporal derivative were used as covariates in a general linear model. The parameter estimates, derived from the mean least-squares fit of the model to the data, reflect the strength of covariance between the data and the canonical response functions for given event-types at each voxel. Individuals' contrast images were taken to second-level group analyses, in which t values were calculated for each voxel, treating intersubject variability as a random effect. Movement parameters were included as covariates of no interest.

Additional Results

Neither participant gender nor race interacted with any of the outcome variables, but the study was not designed to assess such effects. Accordingly we lacked sufficient statistical sensitivity to detect potential effects related to these demographic variables.

Behavioral Data

There was no effect of diagnosis on number of reward ($F=1.5$) or punishment ($F=0.3$) perseverative errors, or on the RT of reward ($F=0.4$) or punishment ($F=1.0$) perseverative trials. This indicates that although depressed patients failed to reverse on the one trial immediately following unexpected reward more frequently than healthy individuals, there was no overall difference in the ability to eventually reverse responses. Thus, depressed individuals did not persist with the previous contingencies for longer than did healthy individuals. It may be that they would have exhibited enhanced perseveration if the same stimulus had not been presented until subjects correctly reversed their predictions, but that is a question for future research.

Interaction Between Behavioral and Hemodynamic Responses

Reward reversal errors correlated positively with putamen response during expected reward in both healthy ($r=0.7, N=14, p=0.005$) and depressed ($r=0.6, N=13, p=0.03$) individuals, potentially reflecting reduced ability to form new stimulus-reward pairings (i.e. increased errors following unexpected reward) in individuals with stronger stimulus-reward pairings (as indexed by greater response in the putamen during expected reward).

References

1. Ashburner J, Friston KJ. Unified segmentation. *Neuroimage* 2005; 26:839–851