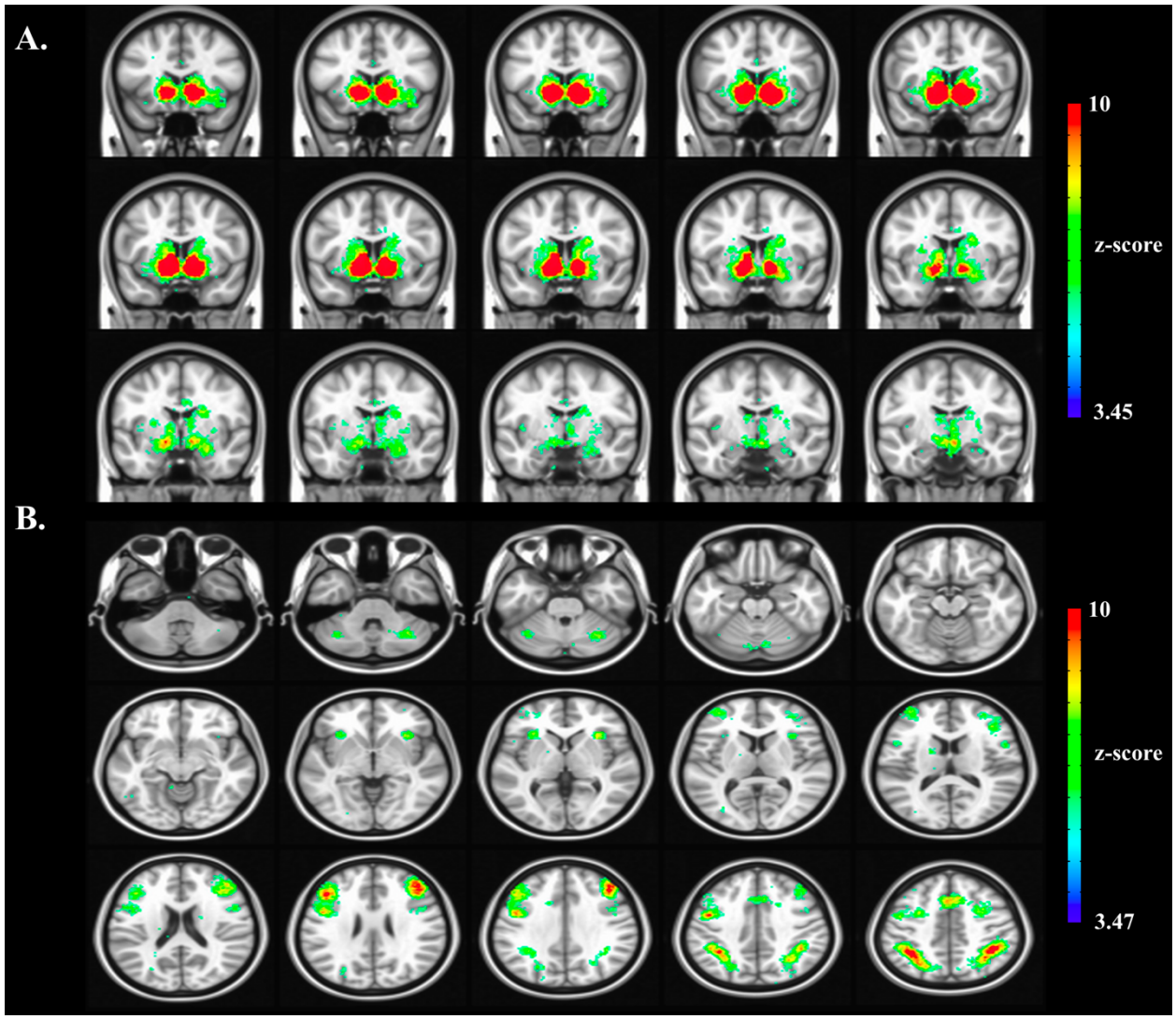
Unedited Supplemental Materials

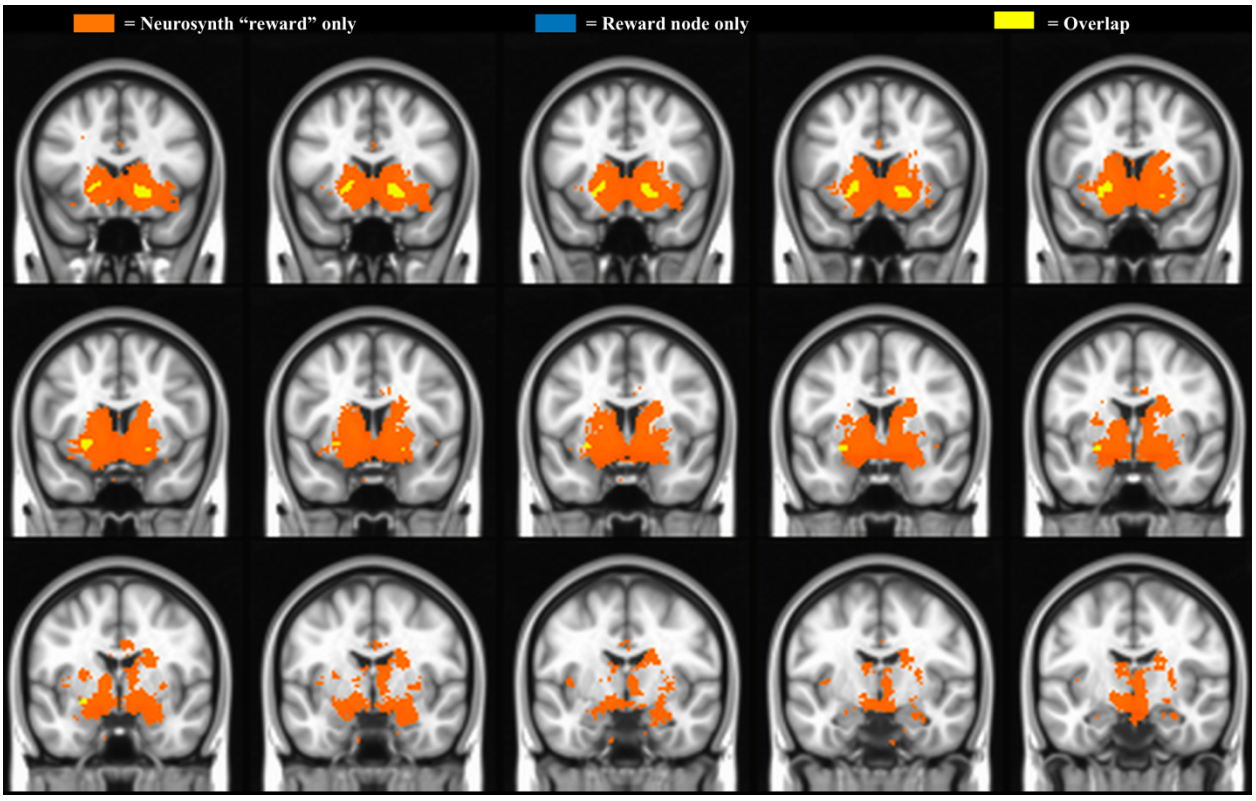
From: Hubbard, N.A., Romeo, R.R., Grotzinger, H., Geibler, M., Imhof, A., Bauer, C.C.C., & Gabrieli, J.D.E. Reward-sensitive basal ganglia stabilize the maintenance of goal-relevant neural patterns in adolescents. *Journal of Cognitive Neuroscience, in press.*

Reproducibility of Reward and Frontoparietal Functional ROIs

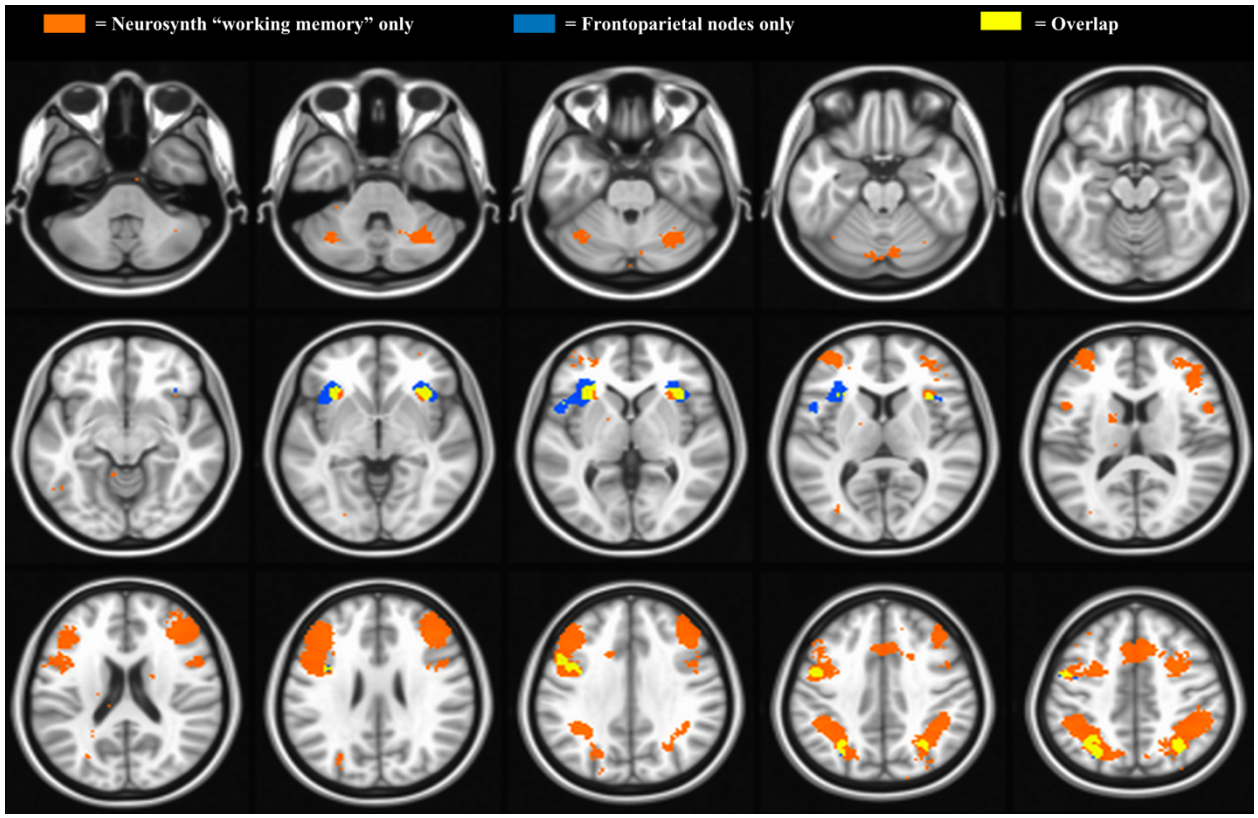
Neurosynth association test maps were used to demonstrate spatial overlap between our primary nodes and those reliably produced by previous functional imaging research (Yarkoni et al., 2011). The key terms "reward" and "working memory" were used to query the *Neurosynth* database. Automated meta-analyses compiled brain activations reliably associated with these key terms (Yarkoni et al., 2011). Positive association test maps (FDR-corrected $p < .01$ [*Neurosynth* default]) comprising 922 task fMRI studies using the "reward" search term and 1091 task functional imaging studies using the "working memory" search term were output. Supplemental Figure 1 demonstrates positive *z*-scores from *Neurosynth* association test map outputs. Supplemental Figure 2 demonstrates spatial overlap between our reward node voxels and reliable reward-related activation from the automated meta-analysis of "reward." Supplemental Figure 3 demonstrates the spatial overlap between our frontoparietal WM nodes and reliable WM-related activation from the automated meta-analysis of "working memory." Together these analyses show that the majority of voxels from our key functional ROIs (i.e., reward node and frontoparietal nodes) lie within the functional boundaries provided by these meta-analyses, offering confidence for the reproducibility of our nodes.



Supplemental Figure 1. **A.** Positive Neurosynth association test z-scores from 922 task fMRI studies using the "reward" search term (FDR-corrected $p < .01$). **B.** Positive Neurosynth association test z-scores from 1091 task fMRI studies using the "working memory" search term (FDR-corrected $p < .01$).



Supplemental Figure 2. Spatial overlap between Neurosynth association test map for "reward" and reward node used in primary analyses. There were only several voxels (not visible here) from the reward node that did not overlap with the Neurosynth association test map.



Supplemental Figure 3. Spatial overlap between Neurosynth association test map for "working memory" and frontoparietal nodes used in primary analyses.

Supplemental Table 1. Partial correlations PS Reward-FP, WM Performance, and Age

Controlling	PS Reward-FP.WM_L	PS Reward-FP.Age
Max FD	.383 (.034)	.344 (.050)
Av FD	.373 (.039)	.353 (.044)
Av censored volume	.398 (.026)	.369 (.035)
Max censored volume	.387 (.031)	.360 (.039)
Sex	.434 (.015)	.393 (.024)
Psychostimulant status	.442 (.013)	.421 (.015)

Partial correlation coefficients and p-values for reward and frontoparietal pattern stability, working memory performance (WM_L), and age relationships while covarying for various factors (see Figure 5B-C). Max FD = maximum framewise displacement; Av FD = average framewise displacement; Av censored volume = average percent of censored volumes per run; Max censored volume = maximum percent of censored volumes per run; Sex = Male or Female; Psychostimulant status = History or No history.

Supplemental Table 2. Partial Effects of Lesioning Reward Node Connections relative to No Lesion

Controlling	η_p^2	p-value
Max FD	.340	<.001
Av FD	.313	.001
Av censored volume	.489	<.001
Max censored volume	.460	<.001
Sex	.305	.001
Psychostimulant status	.534	<.001

Partial-eta^2 (η_p^2) coefficients and p-values for the change in frontoparietal pattern stability after lesioning reward node connections while covarying for various factors (see Figure 6A). Max FD = maximum framewise displacement; Av FD = average framewise displacement; Av censored volume = average percent of censored volumes per run; Max censored volume = maximum percent of censored volumes per run; Sex = Male or Female; Psychostimulant status = History or No history.

Supplemental Table 3. Partial Effects of Lesioning Reward Node Connections relative to Other Subcortical Connections

Controlling	η_p^2	p-value
Max FD	.196	.009
Av FD	.209	.007
Av censored volume	.327	<.001
Max censored volume	.292	.001
Sex	.205	.007
Psychostimulant status	.350	<.001

Partial-eta^2 (η_p^2) coefficients and p-values for the change in frontoparietal pattern stability after lesioning reward node connections relative to other subcortical connections, while covarying for various factors (see Figure 6B). Max FD = maximum framewise displacement; Av FD = average framewise displacement; Av censored volume = average percent of censored volumes per run; Max censored volume = maximum percent of censored volumes per run; Sex = Male or Female; Psychostimulant status = History or No history.

Supplemental Table 4. Partial Effects of Lesion × Circuit Interaction

Controlling	η_p^2	p-value
Max FD	.288	.001
Av FD	.322	<.001
Av censored volume	.434	<.001
Max censored volume	.420	<.001
Sex	.263	.002
Psychostimulant status	.352	<.001

Partial-eta^2 (η_p^2) coefficients and p-values for Lesion × Circuit interaction, while covarying for various factors (see Figure 6C). Max FD = maximum framewise displacement; Av FD = average framewise displacement; Av censored volume = average percent of censored volumes per run; Max censored volume = maximum percent of censored volumes per run; Sex = Male or Female; Psychostimulant status = History or No history.

Supplemental References

Yarkoni, T., Poldrack, R.A., Nichols, T.E., Van Essen, D.C., Wager, T.D. (2011). Large-scale automated synthesis of human functional neuroimaging data. *Nature Methods, 8*(8), 665-670.