FULL SUPPLEMENTARY RESULTS

Manuscript Title:
Multi-task connectivity reveals flexible hubs for adaptive task control

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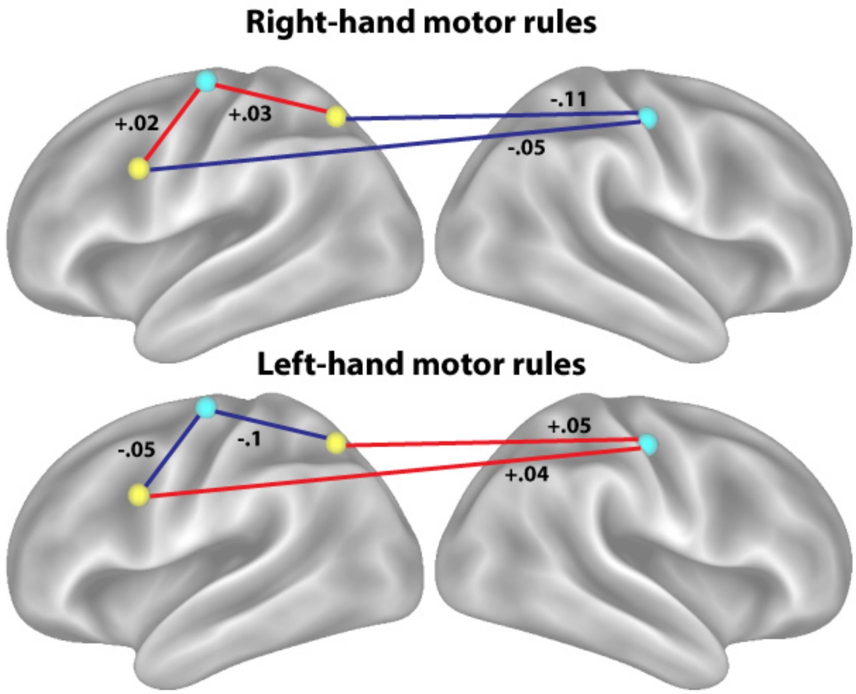
Basic flexible hub functionality: Motor variable connectivity

The flexible hub theory proposes an FPN functional connectivity mechanism that generalizes across a variety of functional networks and across a variety of task domains. In order to ground the other analyses – which more directly test the theory – we focused on FPN functional connectivity with a single functional network (motor/somatosensory) in a single domain (motor response rules). This provided a situation in which specific predictions could be made for pair-wise functional connectivity strengths: FPN regions should shift their functional connections with right and left motor cortex depending on which hand is being used to respond.

To test this hypothesis, we selected the motor region with the highest mean fMRI response during right-hand motor rules ('RIGHT INDEX' and 'RIGHT MIDDLE') and the motor region with the highest mean fMRI response during left-hand motor rules ('LEFT INDEX' and 'LEFT MIDDLE'). The FPN region selected for this analysis was one in LPFC nearest to the location that, in prior work, was postulated to contain a flexible hub, based on findings that this LPFC region showed a correlation between resting-state global brain connectivity and fluid intelligence[1]. Additionally, we selected a second FPN region, in the PPC, based on it showing the highest mean fMRI response averaged across all 64 tasks of all FPN regions. Note that the mean fMRI responses were statistically independent from the context-dependent functional connectivity estimates given that both kinds of regressors were estimated in the same linear model (see **Fig. 3b**).

We found that the context-dependent functional connectivity of both FPN regions shifted significantly between right-hand and left-hand motor rule task states (**Supplementary Fig. 1**). Specifically, both FPN regions were significantly more positively associated with left M1 during right-hand than left-hand motor rules ($p<.02$, t-tests), and this relationship reversed for right M1 ($p<.02$, t-tests). More formally demonstrating this effect, there was a significant 'motor region side' by 'response rule side' ANOVA interaction for the LPFC region ($F(1,14)=9.4$, $p=.009$), the PPC region ($F(1,14)=25.2$, $p=.0002$), and across (via averaging) all FPN regions with all left vs. all right M1/S1 regions ($F(1,14)=9.3$, $p=.009$). These results clearly demonstrate the basic flexible hub mechanism with two anatomically distant FPN regions in a domain with especially clear *a priori* expectations. The primary analyses reported in the main text extend and generalize these results by summarizing FPN functional connectivity changes across a variety of networks and tasks in order to more comprehensively test the flexible hub theory.



Supplementary Figure 1 A simple test of the first flexible hub mechanism, for subsequent analyses to verify and extend. The motor response rules provided an especially straightforward prediction of the flexible hub theory: FPN regions should shift their functional connectivity between left and right M1 depending on whether a left- or right-hand motor rule is being used. Functional connectivity between two FPN regions and two M1/S1 network regions were estimated (see **Fig. 3b**) during tasks involving right-hand ('RIGHT INDEX' or 'RIGHT MIDDLE') or left-hand ('LEFT INDEX' or 'LEFT MIDDLE') motor rules. We used an FPN region near the LPFC region identified by Cole et al.[1], along with the FPN region with the highest mean activation across all 64 tasks (in PPC). The gPPI context-dependent beta estimates (averaged across participants) are shown in the figure. Both FPN regions were significantly more positively associated with left M1 during right-hand than left-hand motor rules ($p<.02$), and this relationship reversed for right M1 ($p<.02$). More formally demonstrating this effect, there was a significant 'motor region side' by 'response rule side' ANOVA interaction for the LPFC region ($p=.009$), the PPC region ($p=.0002$), and across all FPN regions with all left vs. all right M1/S1 regions ($p=.009$).

Variable connectivity across rule dimensions

While we have shown that the FPN shifts its connectivity with a variety of networks, it is technically possible that a subset of the task rule dimensions drove the FPN's variable connectivity. The 64 task states were composed of permutations of 12 rules (4 rules X 3 rule dimensions), with each task state being a set of three rules

(4^3=64). In order to test for broad involvement across the three rule dimensions (designed to be functionally distinct to aid generalization of the findings), the flexible connectivity analyses were repeated for each rule dimension separately. This was possible because the task rules were sampled factorially in a 4 X 4 X 4 design, such that modeling a given rule across all observations would effectively control for the rules in the other dimensions (since they were equally balanced/distributed across observations). The gPPIs were calculated for each rule separately (rather than each task separately), with a separate linear model for each rule dimension. Variable connectivity was then computed as the standard deviation of each connection across each rule dimension's four rules.

As expected, the FPN had the highest GVC for each rule dimension across all networks. FPN's GVC was significantly higher ($p<.05$, FDR corrected) than every network for every dimension except for: DAN, VAN, and motor/somatosensory networks for the sensory rules, and motor/somatosensory and auditory networks for the motor rules. Further, like for the 64-task analysis, the FPN's GVC was significantly higher than the average GVC over the entire brain for every rule dimension separately (**Supplementary table 2**). These results strongly suggest that the FPN's connectivity shifts not only with a wide variety of networks but also across a variety of qualitatively distinct task rules (logical decision, sensory semantic, and motor response).

Results using Pearson correlations and covariances

We repeated many of the analyses using a Pearson correlation approach as an alternative to the gPPI approach. This was done mainly due to the more typical usage of correlation rather than PPI as an index of functional connectivity (at least in resting-state functional connectivity research). Importantly, however, correlations may be more sensitive than regression coefficients (i.e., gPPIs) to changes in noise across conditions[2]. This is due to correlations essentially being estimates of signal-to-noise (i.e., covariance normalized by standard deviations), whereas regression coefficients are estimates of how much one region's signal amplitude changes as a function of another region's signal amplitude (i.e., the linear slope of the relationship). Thus, correlation changes may be more prone to false positives (from changes in independent noise or activity) than gPPI changes. We include analyses using correlation estimate changes despite these potential issues to make greater contact with the standard approach used in this domain, and also because changes in regression slope often result in changes in signal-to-noise such that the results should be similar.

We began by calculating GVC based on partial Pearson correlations (i.e., Pearson correlations after regressing out mean task activation). Like with the gPPI GVC analysis, FPN was significantly higher ($p<.05$, FDR corrected) than all other networks (**Supplementary Table 3**). Further, again like the gPPI analysis, FPN was significantly higher than the whole-brain mean GVC, though this was also true for DMN in this case. DMN showed mostly deactivation across the 64 tasks (**Supplementary Fig. 2**), suggesting the observed high GVC might be due to differential negative (activity-suppressing) functional connectivity across tasks.

Note that the results shown in **Figure 5b** are based on the Pearson correlations, given that Pearson correlations provide a symmetric matrix (necessary for concise visualization), unlike the gPPI values. Importantly, like for the gPPI analysis, the Pearson correlations indicated that FPN's variable connectivity was significantly higher than every network's GVC ($p<.05$, FDR corrected). Also like for the gPPI analysis (see **Fig. 5a**), FPN had the highest variable connectivity participation coefficient across all thresholds (**Supplementary Table 5**). FPN's participation was significantly higher than many of the other networks for many of the thresholds, but not as many as for the gPPI analysis.

Finally, we also conducted all of the analyses described in this section using covariance rather than correlation or gPPIs (regressions). As noted above, a Pearson correlation is covariance divided by the product of two time series' standard deviations (i.e., the normalized covariance). Thus, unlike covariance, correlation estimates can be systematically biased by changes in independent variance (e.g., independent activity or noise in either seed or target regions). Note that gPPIs can also be biased by changes in independent variance in the seed time series since regression coefficients are essentially covariance divided by the variance of the seed time series. Importantly, nearly every result came out the same using the covariance approach, suggesting the results are based on true shifts in inter-region coupling rather than changes in independent variance. Notable differences included the visual network and DAN no longer having significantly lower GVC than FPN (**Supplementary Table 4**), and the FPN having more consistently higher participation than all other networks across thresholds (even compared to the gPPI analysis; **Supplementary Table 7**). The GVC and participation results for all three functional connectivity methods are listed in **Supplementary Table 9**. It will be important for future work to more fully investigate the differences between correlation, regression, and covariance coefficients with regard to functional connectivity.

Supplementary Table 1 64-task gPPI GVC by network. Whole-brain mean GVC (averaged across all 264 regions) = 0.36. P-values were calculated using t-tests paired by subject.
* = p<.05, FDR corrected for multiple comparisons

	Mean	**T-value vs. whole-brain mean**	**P-value vs. whole-brain mean**	**T-value vs. FPN**	**P-value vs. FPN**
Motor network	0.3737	1.5157	0.1518	3.3308	0.0049 *
CON	0.3596	-0.6944	0.4988	8.0670	0.0000 *
Auditory network	0.3758	1.3862	0.1874	2.9520	0.0105 *
DMN	0.3677	1.5805	0.1363	8.6704	0.0000 *
Visual network	0.3680	0.7806	0.4480	4.0828	0.0011 *
FPN	**0.4034**	9.3673	0.0000 *	–	–
SAN	0.3552	-1.3628	0.1945	6.7744	0.0000 *
Subcort. network	0.3306	-5.6355	0.0001 *	11.4428	0.0000 *

			(sig. lower)		
VAN	0.3788	2.0116	0.0639	2.9115	0.0114 *
DAN	0.3760	1.7431	0.1032	2.8900	0.0119 *

Supplementary Table 2 FPN gPPI GVC by rule dimension. P-values were calculated using t-tests paired by subject. In order to test for broad involvement across the three rule dimensions (designed to be functionally distinct to aid generalization of the findings), the flexible connectivity analyses were repeated for each rule dimension separately.
* = p<.05, FDR corrected for multiple comparisons

	FPN GVC	**Whole-brain GVC**	**P-value for diff.**
Logic rules	0.096	0.086	3.6831e-06
Sensory rules	0.094	0.084	3.3886e-05
Motor rules	0.095	0.085	6.5686e-06

Supplementary Table 3 Pearson correlation-based 64-task GVC by network. Whole-brain mean GVC (averaged across all 264 regions) = 0.337. P-values were calculated using t-tests paired by subject. We calculated GVC based on partial Pearson correlations (i.e., Pearson correlations after regressing out mean task activation). Like with the gPPI GVC analysis, FPN was significantly higher (p<.05, FDR corrected) than all other networks. DMN showed mostly deactivation across the 64 tasks (**Supplementary Fig. 2**), suggesting the observed high GVC might be due to differential negative (activity-suppressing) functional connectivity across tasks. Note that a Supplementary Results document – including more details regarding this analysis – is available at http://www.mwcole.net/cole-etal-2013/.
* = p<.05, FDR corrected for multiple comparisons

	Mean	**P-value vs. whole-brain mean**	**P-value vs. FPN**
Motor network	0.3377	0.6318	0.0003 *
CON	0.3346	0.0078 * (sig. lower)	0.0000 *
Auditory network	0.3356	0.1882	0.0002 *
DMN	0.3398	0.0005 *	0.0003 *
Visual network	0.3388	0.2063	0.0177 *
FPN	**0.3431**	0.0000 *	–
SAN	0.3382	0.3243	0.0002 *
Subcort. network	0.3304	0.0001 * (sig. lower)	0.0000 *
VAN	0.3376	0.7253	0.0008 *
DAN	0.3381	0.4995	0.0026 *

Supplementary Table 4 Covariance-based 64-task GVC by network. Whole-brain mean GVC (averaged across all 264 regions) = 6.312. P-values were calculated using t-tests paired by subject. Note that a Supplementary Results document – including more details regarding this analysis – is available at http://www.mwcole.net/cole-etal-2013/.
* = p<.05, FDR corrected for multiple comparisons

	Mean	**P-value vs. whole-brain mean**	**P-value vs. FPN**
Motor network	6.4068	0.5648	0.0105 *
CON	6.2394	0.5767	0.0000 *

Auditory network	6.4589	0.4708	0.0060 *
DMN	6.3199	0.9059	0.0000 *
Visual network	6.6965	0.1492	0.3974
FPN	**6.9792**	0.0000 *	–
SAN	6.2459	0.6084	0.0000 *
Subcort. network	5.7982	0.0078 * (sig. lower)	0.0000 *
VAN	6.4671	0.3719	0.0132 *
DAN	6.5224	0.2861	0.0996

Supplementary Table 5 Participation coefficient of variable connectivity (standard deviation of gPPI estimates across the 64 tasks) by network. Participation values were calculated for each region and averaged across regions in each network. P-values were calculated using t-tests paired by subject. The thresholds were standard density thresholds, in which the top percentage of connections are selected for analysis[9].

* = Lower than FPN's participation; p<.05, FDR corrected for multiple comparisons

	Variable connectivity thresholds				
	2%	**4%**	**6%**	**8%**	**10%**
Motor network	0.6567*	0.7567*	0.7982*	0.8174*	0.8289*
CON	0.6879*	0.7961*	0.8305*	0.8481*	0.8593*
Auditory network	0.7133*	0.798*	0.8369*	0.8525*	0.8645*
DMN	0.6733*	0.7771*	0.82*	0.8397*	0.8499*
Visual network	0.6994*	0.7982*	0.8333*	0.8489*	0.8627*
FPN	**0.76**	**0.832**	**0.8568**	**0.8712**	**0.8785**
SAN	0.6731*	0.7593*	0.7983*	0.8248*	0.8416*
Subcort. network	0.6636*	0.7843*	0.8256*	0.8429*	0.855*
VAN	0.7173*	0.8194	0.8525	0.8659	0.8746
DAN	0.6786*	0.798*	0.8357	0.8516	0.8656

Supplementary Table 6 Pearson correlation-based participation coefficient of variable connectivity (standard deviation of correlation estimates across the 64 tasks) by network. Participation values were calculated for each region and averaged across regions in each network. P-values were calculated using t-tests paired by subject. Like for the gPPI analysis (see **Fig. 5a**), FPN had the highest variable connectivity participation coefficient across all thresholds (**Supplementary Table 6**). FPN's participation was significantly higher than many of the other networks for many of the thresholds, but not as many as for the gPPI analysis. Note that a Supplementary Results document – including more details regarding this analysis – is available at http://www.mwcole.net/cole-etal-2013/.

* = Lower than FPN's participation; p<.05, FDR corrected for multiple comparisons

	Variable connectivity thresholds				
	2%	**4%**	**6%**	**8%**	**10%**
Motor network	0.4398 *	0.6179 *	0.7041 *	0.7568 *	0.79
CON	0.3681 *	0.5734 *	0.6859 *	0.7413	0.7732
Auditory network	0.3868 *	0.6007 *	0.7006	0.7427	0.7855
DMN	0.4896	0.6459	0.7189	0.7638	0.7902

Visual network	0.4567	0.6243 *	0.7128	0.7609	0.7892
FPN	**0.5343**	**0.6941**	**0.7554**	**0.7901**	**0.8078**
SAN	0.4412 *	0.6064 *	0.696 *	0.7405 *	0.7724 *
Subcort. network	0.2547 *	0.4827 *	0.6179 *	0.6905 *	0.7361 *
VAN	0.4296	0.6348	0.7111	0.758	0.7903
DAN	0.4606	0.6303 *	0.7265	0.7609	0.7929

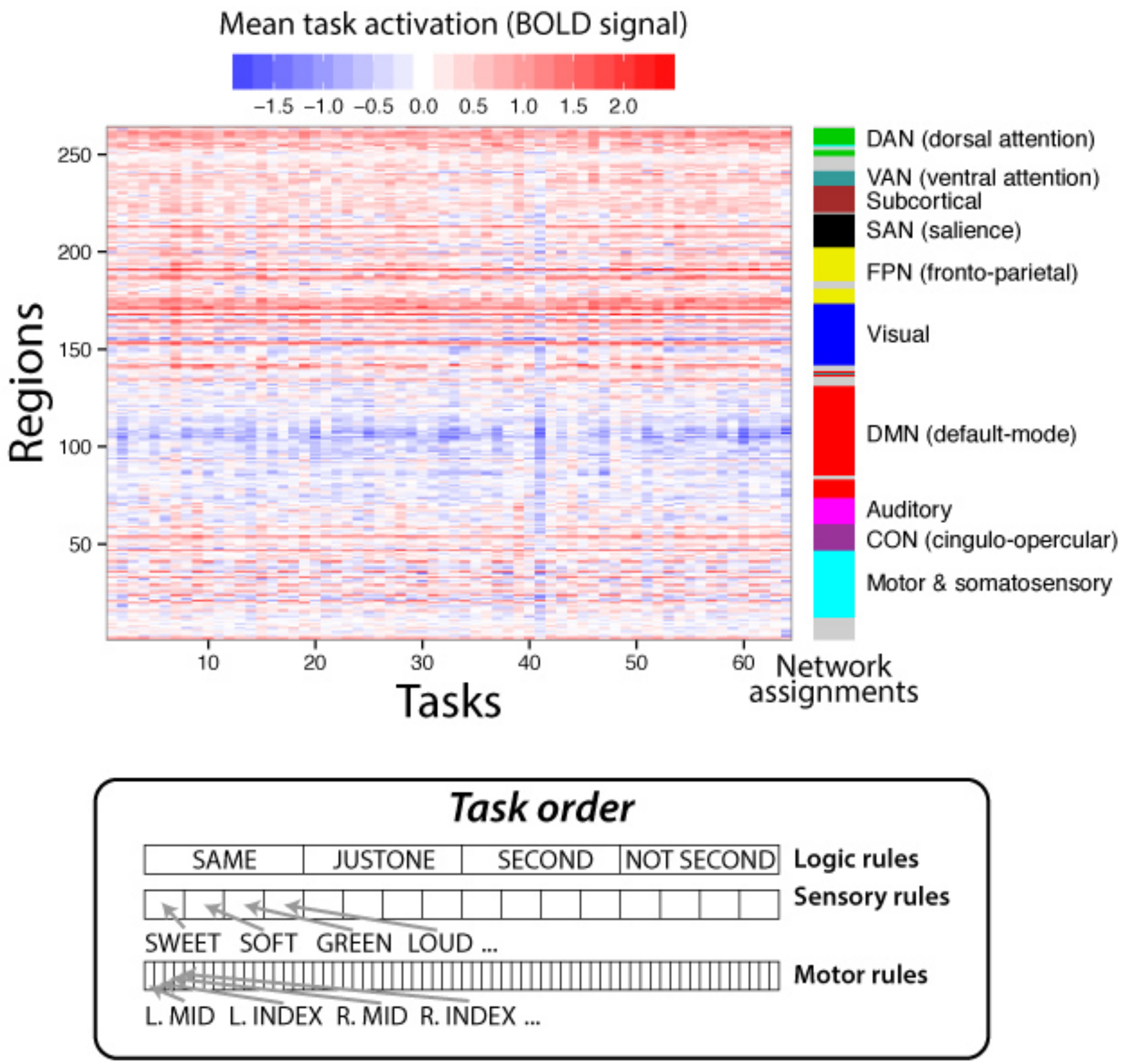
Supplementary Table 7 Covariance-based participation coefficient of variable connectivity (standard deviation of covariance estimates across the 64 tasks) by network. Participation values were calculated for each region and averaged across regions in each network. P-values were calculated using t-tests paired by subject. Note that a Supplementary Results document – including more details regarding this analysis – is available at http://www.mwcole.net/cole-etal-2013/.

* = Lower than FPN's participation; p<.05, FDR corrected for multiple comparisons

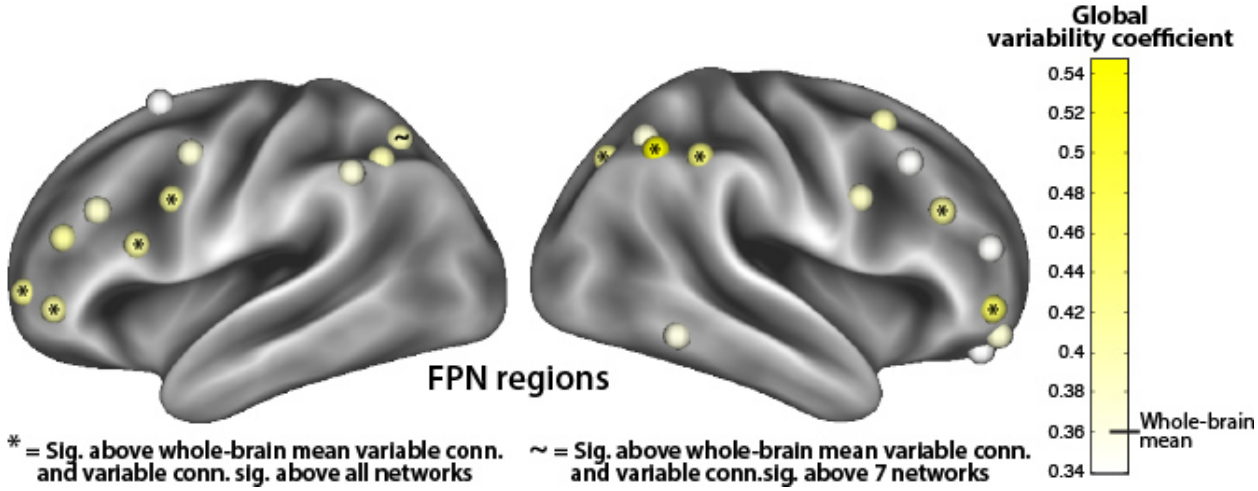
	Variable connectivity thresholds				
	2%	**4%**	**6%**	**8%**	**10%**
Motor network	0.3545 *	0.4989 *	0.578 *	0.617 *	0.6602 *
CON	0.2972 *	0.4491 *	0.5416 *	0.621 *	0.6771 *
Auditory network	0.3405 *	0.4998	0.5921 *	0.6475 *	0.6989 *
DMN	0.3471 *	0.492 *	0.5816 *	0.6392 *	0.6773 *
Visual network	0.3965 *	0.5364 *	0.6315 *	0.6832 *	0.7204 *
FPN	**0.4745**	**0.6236**	**0.712**	**0.7517**	**0.7806**
SAN	0.3717 *	0.4796 *	0.5749 *	0.6222 *	0.6618 *
Subcort. network	0.185 *	0.4104 *	0.4963 *	0.5936 *	0.6535 *
VAN	0.3449 *	0.5082 *	0.5895 *	0.6807 *	0.7456
DAN	0.3634 *	0.5345 *	0.6023 *	0.6547 *	0.6884 *

Supplementary Table 8 FPN regions with significantly (P<.05, FDR corrected) greater gPPI variable connectivity than every network's individual global/mean variable connectivity. P-values were calculated using t-tests paired by subject.

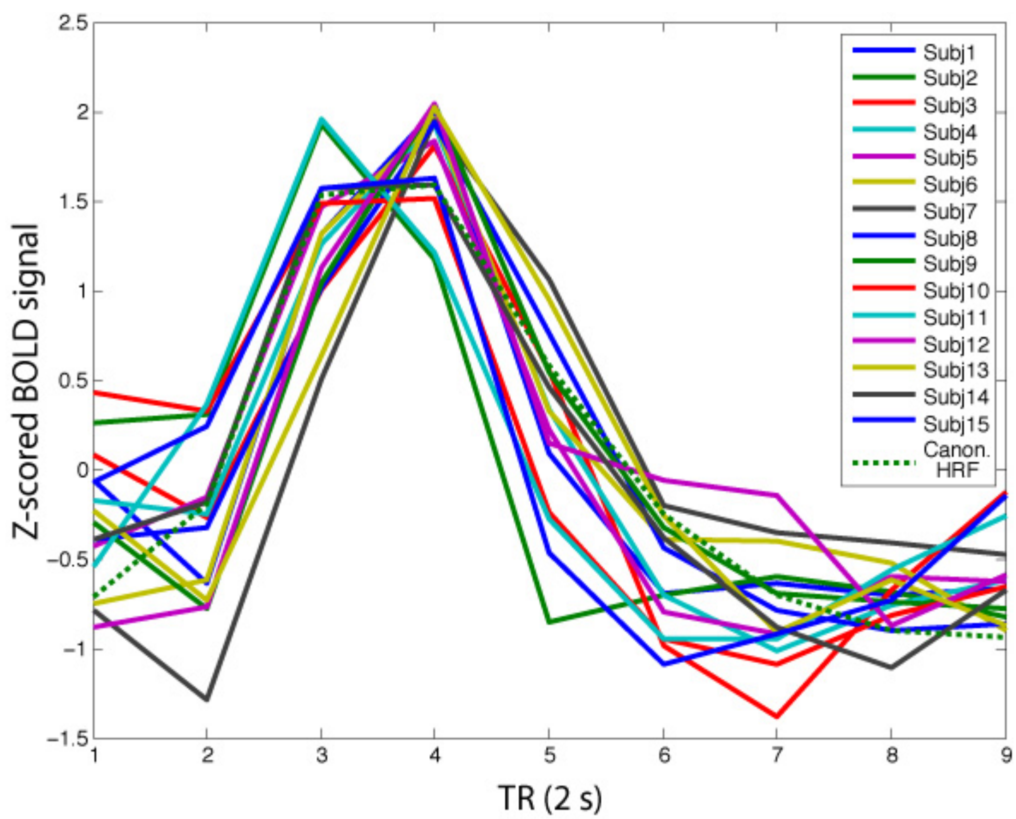
Anatomy	**Area**	**X coord.**	**Y coord.**	**Z coord.**	**Mean t-stat**	**Mean p-value**
R. dorsal LPFC	9	45	19	30	3.6992	0.0057
L. dorsal LPFC	6/9	-40	2	33	3.5023	0.0081
L. dorsal LPFC	9	-45	7	24	3.2075	0.0139
R. PPC	40	46	-45	44	4.6341	0.0007
R. PPC	40	41	-55	45	4.9793	0.0003
R. PPC	19/39	35	-66	38	3.6295	0.0068
L. anterior LPFC	10	-33	49	9	3.2475	0.0103
L. anterior LPFC	10	-40	40	2	3.2370	0.0092
R. anterior LPFC	10	41	43	4	4.5724	0.0008



Supplementary Figure 2 Mean BOLD activity for all 264 regions across all 64 tasks.



Supplementary Figure 3 Individual FPN region effects, highlighting regions that have GVC significantly above the whole-brain mean variable connectivity ($p<.05$, FDR corrected). These regions (except for one marked ~) also had significantly higher variable connectivity with each network than each of those network's GVC (like FPN as a whole in **Fig. 5b**). The single FPN region on the medial wall (not shown) had the lowest GVC of the FPN regions (.34).



Supplementary Figure 4 Empirically estimated hemodynamic response functions (HRFs) for each participant, along with SPM's canonical HRF. Each empirical HRF was based on hundreds of visual and motor events (480 visual events, 360 motor events) per subject. R-squared values between the SPM canonical HRF and each subject's empirical HRF (in same order as figure): .84, .58, .69, .88, .90, .92, .64, .93, .88, .66, .71, .84, .79, .97, and .65.

Supplementary Table 9 Location and graph theoretical data for all regions, averaged across participants. Participation coefficient is reported as the mean across all five thresholds. Results from gPPI, Pearson correlation, and covariance analyses are included. Network assignment numbers: 1=somato-motor, 3=CON, 4=auditory, 5=DMN, 7=visual, 8=FPN, 9=SAN, 10=subcortical, 11=VAN, 12=DAN, -1=uncertain. Pearson correlations among the different functional connectivity measures (i.e., across columns of the table): GVC (gPPI & corr)=.74, participation (gPPI & corr)=.60, GVC (gPPI & cov)=.98, participation (gPPI & cov)=.81, GVC (corr & cov)=.78, participation (corr & cov)=.76.

	Net	Tal. Coords	GVC (gPPI)	Participation (gPPI)	GVC (corr)	Participation (corr)	GVC (cov)	Participation (cov)
1	-1	-23,-96,-15	0.370	0.841	0.343	0.733	6.195	0.642
2	-1	26,-96,-15	0.345	0.717	0.344	0.797	6.168	0.621
3	-1	23,27,-12	0.337	0.815	0.337	0.587	5.833	0.589
4	-1	-53,-45,-24	0.104	0.020	0.315	0.343	1.593	0.000
5	-1	8,36,-18	0.241	0.613	0.332	0.652	4.129	0.324
6	-1	-20,-24,-18	0.276	0.738	0.322	0.391	4.591	0.296
7	-1	17,-30,-15	0.454	0.868	0.310	0.245	6.889	0.649
8	-1	-35,-30,-24	0.187	0.364	0.322	0.367	3.090	0.000
9	-1	62,-27,-15	0.228	0.547	0.321	0.400	3.737	0.208
10	-1	50,-36,-24	0.114	0.083	0.311	0.289	1.763	0.000
11	-1	53,-33,-14	0.260	0.696	0.319	0.441	4.115	0.078
12	-1	32,33,-6	0.353	0.823	0.343	0.704	6.504	0.649
13	1	-8,-54,57	0.385	0.814	0.342	0.733	6.991	0.642
14	1	-14,-21,39	0.206	0.444	0.316	0.332	3.205	0.000
15	1	-1,-18,46	0.397	0.843	0.343	0.743	7.334	0.731
16	1	8,-6,45	0.341	0.813	0.335	0.697	5.811	0.477
17	1	-8,-24,63	0.283	0.737	0.329	0.621	4.720	0.300
18	1	-8,-36,69	0.409	0.813	0.340	0.700	7.367	0.620
19	1	11,-36,72	0.462	0.867	0.340	0.690	8.145	0.739
20	1	-52,-25,41	0.374	0.795	0.342	0.725	6.318	0.590
21	1	26,-21,69	0.493	0.828	0.348	0.758	8.859	0.699
22	1	8,-48,69	0.462	0.837	0.341	0.686	7.950	0.719
23	1	-23,-33,69	0.404	0.851	0.341	0.723	6.956	0.589
24	1	-39,-22,52	0.400	0.839	0.343	0.736	6.581	0.645
25	1	26,-42,57	0.349	0.809	0.334	0.582	6.058	0.480
26	1	47,-24,42	0.400	0.845	0.337	0.629	6.598	0.578
27	1	-38,-30,66	0.127	0.147	0.334	0.598	2.045	0.000
28	1	18,-32,58	0.294	0.702	0.330	0.535	4.981	0.278
29	1	41,-12,57	0.390	0.811	0.339	0.655	6.616	0.699
30	1	-29,-45,57	0.374	0.845	0.339	0.666	6.715	0.668
31	1	8,-21,72	0.501	0.864	0.343	0.732	8.848	0.785
32	1	20,-45,66	0.455	0.865	0.336	0.647	7.624	0.629

33	1	-44,-34,44	0.383	0.845	0.345	0.701	6.324	0.618
34	1	-21,-34,58	0.284	0.707	0.328	0.507	4.898	0.266
35	1	-14,-21,72	0.379	0.761	0.337	0.646	6.596	0.441
36	1	39,-24,54	0.466	0.860	0.347	0.800	7.904	0.755
37	1	-38,-18,66	0.116	0.175	0.330	0.533	1.820	0.000
38	1	-17,-48,69	0.443	0.822	0.340	0.662	7.676	0.570
39	1	1,-31,58	0.369	0.821	0.337	0.689	6.269	0.611
40	1	2,-21,57	0.377	0.818	0.340	0.731	6.625	0.596
41	1	35,-21,45	0.418	0.860	0.339	0.685	7.068	0.724
42	1	-48,-14,34	0.384	0.836	0.339	0.723	6.506	0.616
43	1	34,-13,16	0.323	0.760	0.331	0.571	5.455	0.400
44	1	48,-10,34	0.424	0.851	0.339	0.680	7.067	0.642
45	1	-51,-13,24	0.396	0.842	0.335	0.633	6.456	0.606
46	1	62,-12,27	0.385	0.809	0.339	0.700	6.509	0.606
47	3	-4,-2,53	0.318	0.801	0.331	0.550	5.205	0.337
48	3	51,-31,34	0.417	0.860	0.338	0.692	7.011	0.579
49	3	17,-12,63	0.320	0.777	0.332	0.596	5.406	0.355
50	3	-17,-9,69	0.368	0.783	0.336	0.619	6.306	0.433
51	3	-11,-6,42	0.228	0.625	0.318	0.292	3.540	0.050
52	3	35,-3,0	0.349	0.829	0.331	0.648	6.216	0.464
53	3	11,-6,69	0.376	0.838	0.335	0.613	6.567	0.522
54	3	5,3,51	0.390	0.818	0.341	0.753	6.844	0.695
55	3	-43,-3,10	0.354	0.797	0.334	0.650	5.929	0.543
56	3	47,4,3	0.437	0.867	0.340	0.680	7.848	0.816
57	3	-33,0,6	0.349	0.804	0.333	0.678	6.008	0.553
58	3	-49,5,0	0.465	0.872	0.349	0.808	8.560	0.808
59	3	-6,13,36	0.333	0.795	0.338	0.708	6.216	0.522
60	3	34,6,5	0.331	0.797	0.329	0.511	5.684	0.565
61	4	30,-29,14	0.268	0.611	0.328	0.551	4.303	0.196
62	4	62,-36,21	0.455	0.858	0.342	0.672	8.087	0.776
63	4	55,-19,10	0.438	0.868	0.341	0.683	7.720	0.666
64	4	-37,-35,16	0.351	0.831	0.330	0.562	5.938	0.490
65	4	-58,-27,13	0.390	0.870	0.340	0.668	6.948	0.736
66	4	-47,-28,5	0.352	0.814	0.330	0.646	5.841	0.504
67	4	41,-26,21	0.438	0.857	0.340	0.740	7.509	0.697
68	4	-48,-36,24	0.319	0.784	0.331	0.580	5.200	0.455
69	4	-51,-24,22	0.346	0.788	0.334	0.610	5.808	0.452
70	4	-53,-12,12	0.406	0.844	0.339	0.704	7.292	0.660
71	4	53,-9,16	0.404	0.860	0.340	0.699	7.101	0.663
72	4	56,-21,30	0.417	0.839	0.338	0.699	7.068	0.627
73	4	-29,-29,12	0.301	0.746	0.329	0.549	5.112	0.303
74	5	-39,-75,22	0.359	0.822	0.345	0.794	6.581	0.577
75	5	5,60,3	0.444	0.885	0.354	0.800	7.402	0.626

76	5	8,42,-9	0.334	0.821	0.337	0.628	5.850	0.478
77	5	-12,-41,1	0.354	0.808	0.328	0.450	5.896	0.535
78	5	-17,57,-3	0.358	0.829	0.341	0.658	6.354	0.588
79	5	-44,-61,18	0.385	0.855	0.345	0.774	6.539	0.596
80	5	41,-73,26	0.428	0.872	0.345	0.761	7.820	0.681
81	5	-41,9,-30	0.317	0.745	0.330	0.632	5.382	0.390
82	5	44,12,-24	0.338	0.823	0.326	0.533	5.334	0.457
83	5	-65,-24,-15	0.142	0.188	0.320	0.360	2.182	0.053
84	-1	-55,-27,-14	0.270	0.714	0.325	0.516	4.381	0.197
85	-1	26,12,-12	0.356	0.818	0.331	0.557	6.215	0.599
86	5	-43,-65,31	0.432	0.857	0.350	0.809	7.600	0.726
87	5	-38,-75,39	0.451	0.825	0.351	0.788	7.568	0.629
88	5	-7,-56,25	0.386	0.831	0.350	0.813	6.633	0.614
89	5	5,-60,33	0.435	0.870	0.349	0.803	7.439	0.710
90	5	-11,-57,14	0.373	0.768	0.341	0.720	6.532	0.563
91	5	-3,-50,12	0.415	0.834	0.344	0.742	6.911	0.634
92	5	7,-50,29	0.389	0.834	0.345	0.786	6.412	0.528
93	5	14,-64,24	0.367	0.794	0.340	0.662	6.653	0.587
94	5	-3,-39,42	0.386	0.832	0.344	0.773	6.795	0.662
95	5	10,-55,16	0.348	0.744	0.339	0.717	6.074	0.530
96	5	49,-61,34	0.491	0.875	0.348	0.788	8.358	0.793
97	5	21,27,50	0.360	0.803	0.346	0.750	6.016	0.526
98	5	-11,33,54	0.416	0.838	0.342	0.713	6.703	0.599
99	5	-17,23,54	0.382	0.829	0.347	0.750	6.401	0.601
100	5	-35,15,51	0.363	0.783	0.342	0.765	6.127	0.570
101	5	20,33,42	0.324	0.767	0.340	0.708	5.402	0.405
102	5	11,48,42	0.393	0.831	0.341	0.745	6.527	0.628
103	5	-11,48,42	0.420	0.845	0.345	0.748	7.057	0.714
104	5	-20,39,42	0.363	0.799	0.343	0.768	6.299	0.599
105	5	5,48,21	0.503	0.880	0.356	0.828	9.004	0.817
106	5	5,57,27	0.492	0.874	0.347	0.759	8.524	0.707
107	5	-7,45,4	0.457	0.855	0.353	0.823	8.273	0.725
108	5	8,48,9	0.428	0.856	0.350	0.819	7.402	0.755
109	5	-3,39,-4	0.489	0.883	0.354	0.818	8.892	0.808
110	5	7,37,0	0.373	0.830	0.344	0.742	6.683	0.622
111	5	-11,39,12	0.249	0.581	0.328	0.474	4.071	0.201
112	5	-3,32,39	0.401	0.830	0.349	0.770	7.184	0.732
113	5	-3,36,20	0.367	0.808	0.343	0.756	6.782	0.676
114	5	-20,57,24	0.451	0.853	0.354	0.814	8.456	0.768
115	5	-8,42,27	0.285	0.708	0.334	0.619	4.836	0.263
116	5	62,-15,-15	0.266	0.668	0.328	0.512	4.522	0.256
117	5	-53,-15,-9	0.312	0.775	0.339	0.680	5.427	0.421
118	5	-55,-31,-4	0.357	0.829	0.334	0.625	5.848	0.533

119	5	62,-33,-6	0.380	0.849	0.336	0.621	6.309	0.563
120	5	-65,-42,-6	0.210	0.488	0.321	0.423	3.204	0.090
121	5	11,24,60	0.384	0.833	0.344	0.728	6.690	0.600
122	5	11,30,24	0.266	0.674	0.330	0.500	4.610	0.215
123	5	50,-6,-12	0.325	0.815	0.331	0.663	5.500	0.439
124	5	-25,-41,-8	0.379	0.848	0.327	0.502	6.227	0.593
125	5	26,-39,-11	0.380	0.835	0.329	0.540	6.405	0.616
126	5	-32,-39,-15	0.322	0.784	0.330	0.538	5.564	0.478
127	5	28,-76,-31	0.301	0.760	0.335	0.730	5.156	0.375
128	5	50,3,-24	0.326	0.776	0.328	0.533	5.473	0.446
129	5	-50,0,-24	0.290	0.749	0.332	0.563	5.024	0.314
130	5	44,-52,28	0.327	0.706	0.337	0.640	5.392	0.422
131	5	-47,-43,0	0.318	0.770	0.322	0.376	4.968	0.333
132	-1	-29,15,-15	0.364	0.829	0.338	0.694	6.594	0.654
133	-1	-3,-37,30	0.371	0.831	0.344	0.724	6.371	0.573
134	-1	-7,-72,38	0.472	0.849	0.354	0.791	8.537	0.768
135	-1	10,-67,39	0.335	0.765	0.340	0.739	5.745	0.497
136	-1	3,-50,48	0.409	0.849	0.347	0.745	7.471	0.700
137	5	-44,27,-9	0.365	0.775	0.338	0.729	6.342	0.674
138	11	-11,6,66	0.326	0.759	0.335	0.653	5.602	0.384
139	5	47,30,-6	0.376	0.840	0.339	0.671	6.900	0.712
140	-1	8,-90,-9	0.502	0.867	0.346	0.819	9.302	0.824
141	-1	17,-90,-15	0.661	0.868	0.342	0.716	11.626	0.809
142	-1	-11,-93,-15	0.474	0.876	0.336	0.666	7.771	0.702
143	7	17,-48,-9	0.373	0.854	0.325	0.364	6.170	0.577
144	7	38,-73,13	0.338	0.780	0.338	0.693	5.945	0.524
145	7	8,-72,9	0.459	0.871	0.341	0.716	8.566	0.767
146	7	-8,-80,5	0.390	0.845	0.337	0.668	7.219	0.611
147	7	-27,-79,16	0.322	0.713	0.339	0.695	5.827	0.520
148	7	19,-66,1	0.300	0.716	0.330	0.592	5.266	0.412
149	7	-23,-90,15	0.413	0.855	0.346	0.798	7.841	0.721
150	7	26,-60,-9	0.372	0.826	0.334	0.624	6.510	0.635
151	7	-14,-72,-9	0.332	0.774	0.338	0.711	5.812	0.483
152	7	-17,-68,3	0.302	0.759	0.328	0.517	5.196	0.382
153	7	41,-78,-12	0.406	0.834	0.341	0.710	7.358	0.704
154	7	-44,-75,-12	0.309	0.774	0.339	0.738	5.541	0.588
155	7	-14,-90,27	0.420	0.836	0.350	0.794	7.900	0.664
156	7	14,-87,33	0.459	0.845	0.355	0.807	8.655	0.772
157	7	27,-77,23	0.324	0.732	0.337	0.685	6.202	0.533
158	7	19,-85,-4	0.256	0.668	0.333	0.483	4.794	0.228
159	7	14,-77,28	0.375	0.809	0.345	0.709	7.149	0.690
160	7	-15,-53,-2	0.352	0.814	0.328	0.476	6.116	0.575
161	7	40,-66,-8	0.346	0.806	0.332	0.600	6.034	0.530

162	7	23,-87,21	0.375	0.814	0.343	0.703	7.106	0.634
163	7	5,-72,21	0.469	0.868	0.347	0.742	8.706	0.800
164	7	-40,-73,-2	0.311	0.743	0.334	0.582	5.469	0.321
165	7	25,-79,-16	0.407	0.859	0.341	0.746	7.142	0.641
166	7	-16,-77,30	0.329	0.808	0.339	0.693	6.380	0.552
167	7	-3,-81,18	0.434	0.875	0.345	0.782	7.963	0.770
168	7	-38,-87,-9	0.342	0.823	0.341	0.689	6.218	0.643
169	7	35,-84,11	0.407	0.861	0.344	0.730	7.374	0.653
170	7	6,-81,4	0.421	0.873	0.342	0.734	8.103	0.758
171	7	-25,-89,0	0.351	0.799	0.339	0.671	6.196	0.549
172	7	-31,-78,-15	0.371	0.819	0.340	0.673	6.669	0.659
173	7	35,-81,0	0.343	0.811	0.334	0.609	5.999	0.497
174	8	-43,-2,45	0.377	0.826	0.339	0.682	6.443	0.673
175	8	45,19,30	0.433	0.864	0.345	0.747	7.354	0.729
176	8	-45,7,24	0.425	0.855	0.341	0.724	7.216	0.711
177	8	-51,-50,39	0.373	0.815	0.344	0.740	6.552	0.688
178	8	-23,6,63	0.340	0.789	0.337	0.642	5.669	0.506
179	8	56,-54,-12	0.367	0.850	0.339	0.726	6.469	0.598
180	8	23,39,-9	0.341	0.825	0.338	0.703	6.083	0.518
181	8	32,48,-6	0.381	0.858	0.338	0.679	6.508	0.684
182	-1	-20,36,-15	0.310	0.726	0.328	0.494	4.948	0.496
183	-1	-16,-75,-25	0.309	0.775	0.337	0.680	5.426	0.557
184	-1	17,-79,-34	0.334	0.750	0.337	0.688	6.156	0.451
185	-1	34,-67,-33	0.285	0.724	0.328	0.478	4.777	0.343
186	8	44,5,35	0.393	0.837	0.338	0.635	6.654	0.608
187	8	-40,2,33	0.431	0.876	0.342	0.681	7.298	0.730
188	8	-41,33,24	0.425	0.845	0.347	0.772	7.508	0.697
189	8	36,37,20	0.345	0.790	0.336	0.632	5.757	0.527
190	8	46,-45,44	0.454	0.866	0.348	0.746	7.781	0.775
191	8	-28,-59,44	0.408	0.851	0.348	0.774	7.220	0.719
192	8	41,-55,45	0.548	0.879	0.353	0.775	9.654	0.840
193	8	29,9,57	0.409	0.843	0.347	0.741	7.123	0.689
194	8	35,-66,38	0.440	0.863	0.348	0.750	7.733	0.703
195	8	-41,-56,41	0.408	0.838	0.345	0.762	7.400	0.717
196	8	37,13,42	0.345	0.801	0.337	0.652	5.675	0.503
197	8	-33,49,9	0.440	0.857	0.351	0.736	7.750	0.740
198	8	-40,40,2	0.427	0.851	0.346	0.731	7.554	0.738
199	8	31,-55,42	0.373	0.825	0.343	0.719	6.414	0.604
200	8	41,43,4	0.479	0.878	0.352	0.773	8.179	0.814
201	8	-41,20,31	0.386	0.839	0.339	0.647	6.543	0.638
202	8	-4,21,46	0.339	0.773	0.339	0.739	5.854	0.563
203	9	9,-41,48	0.316	0.796	0.332	0.536	5.467	0.340
204	9	52,-47,36	0.465	0.880	0.345	0.737	8.108	0.765

205	9	39,-5,48	0.341	0.800	0.334	0.615	5.684	0.464
206	9	29,27,30	0.247	0.595	0.325	0.514	4.090	0.205
207	9	45,17,14	0.352	0.793	0.330	0.605	5.680	0.517
208	9	-34,16,3	0.429	0.855	0.340	0.681	7.708	0.777
209	9	34,17,7	0.369	0.822	0.335	0.582	6.550	0.628
210	9	35,27,3	0.357	0.802	0.337	0.733	6.181	0.551
211	9	32,12,-3	0.360	0.835	0.332	0.625	6.348	0.650
212	9	-11,21,27	0.206	0.466	0.320	0.376	3.406	0.049
213	9	-2,10,45	0.422	0.839	0.345	0.798	7.536	0.731
214	9	-27,46,25	0.360	0.801	0.348	0.802	6.510	0.694
215	9	-1,25,30	0.363	0.795	0.346	0.746	6.735	0.624
216	9	4,18,39	0.397	0.838	0.351	0.792	7.224	0.760
217	9	9,17,30	0.254	0.617	0.326	0.405	4.494	0.115
218	9	29,49,20	0.407	0.836	0.350	0.775	7.168	0.710
219	9	24,43,31	0.328	0.816	0.343	0.731	5.698	0.425
220	9	-38,45,21	0.422	0.846	0.348	0.672	7.823	0.751
221	-1	1,-27,30	0.402	0.837	0.347	0.757	6.822	0.702
222	10	6,-26,1	0.372	0.847	0.320	0.419	6.106	0.512
223	10	-2,-16,13	0.391	0.837	0.339	0.719	6.930	0.707
224	10	-10,-21,8	0.302	0.730	0.330	0.525	5.532	0.426
225	10	11,-20,9	0.323	0.800	0.337	0.644	5.908	0.439
226	10	-5,-30,-3	0.348	0.826	0.320	0.419	5.752	0.517
227	10	-21,4,-2	0.355	0.829	0.335	0.619	6.474	0.603
228	10	-15,0,10	0.271	0.703	0.328	0.510	4.697	0.233
229	10	29,-17,4	0.328	0.788	0.327	0.522	5.678	0.465
230	10	22,6,5	0.340	0.835	0.335	0.627	6.133	0.565
231	10	27,-3,7	0.334	0.807	0.328	0.520	5.666	0.478
232	10	-30,-14,1	0.308	0.763	0.328	0.517	5.408	0.371
233	10	14,1,10	0.312	0.789	0.336	0.660	5.609	0.388
234	10	8,-7,8	0.313	0.773	0.332	0.534	5.474	0.377
235	11	51,-45,22	0.389	0.849	0.339	0.726	6.739	0.611
236	11	-54,-51,8	0.333	0.797	0.336	0.582	5.670	0.496
237	11	-53,-41,12	0.310	0.786	0.335	0.668	5.224	0.367
238	11	49,-35,9	0.355	0.835	0.331	0.603	5.684	0.429
239	11	49,-31,-2	0.384	0.843	0.332	0.531	6.358	0.607
240	11	53,-48,12	0.427	0.844	0.338	0.682	7.282	0.698
241	11	50,27,6	0.388	0.846	0.343	0.749	6.723	0.749
242	11	-47,21,2	0.498	0.873	0.349	0.789	8.906	0.824
243	-1	-15,-65,-20	0.314	0.794	0.330	0.584	5.778	0.520
244	-1	-30,-55,-25	0.301	0.742	0.333	0.618	5.244	0.450
245	-1	22,-58,-22	0.290	0.739	0.325	0.529	5.093	0.349
246	-1	1,-62,-18	0.284	0.779	0.324	0.476	5.001	0.317
247	-1	32,-15,-30	0.217	0.504	0.323	0.448	3.725	0.020

248	-1	-29,-12,-33	0.233	0.576	0.327	0.610	4.308	0.125
249	-1	47,-6,-33	0.249	0.623	0.325	0.493	4.434	0.187
250	-1	-47,-9,-36	0.190	0.374	0.322	0.414	3.200	0.098
251	12	8,-63,57	0.551	0.849	0.345	0.801	9.426	0.820
252	12	-50,-63,3	0.318	0.789	0.339	0.711	5.549	0.555
253	-1	-44,-51,-21	0.304	0.742	0.337	0.599	5.441	0.567
254	-1	44,-48,-15	0.343	0.831	0.333	0.614	5.965	0.655
255	1	44,-33,48	0.429	0.870	0.341	0.711	7.275	0.648
256	12	20,-66,45	0.376	0.843	0.345	0.766	6.967	0.572
257	12	44,-60,4	0.326	0.743	0.332	0.586	5.675	0.479
258	12	23,-60,57	0.515	0.869	0.345	0.711	9.158	0.712
259	12	-32,-48,44	0.301	0.776	0.333	0.615	5.181	0.465
260	12	-26,-71,33	0.302	0.728	0.337	0.633	5.251	0.457
261	12	-32,-5,53	0.350	0.817	0.334	0.668	5.870	0.538
262	12	-40,-60,-10	0.321	0.791	0.328	0.515	5.357	0.449
263	12	-17,-60,60	0.422	0.828	0.343	0.728	7.081	0.674
264	12	26,-9,54	0.354	0.832	0.336	0.683	6.210	0.534

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