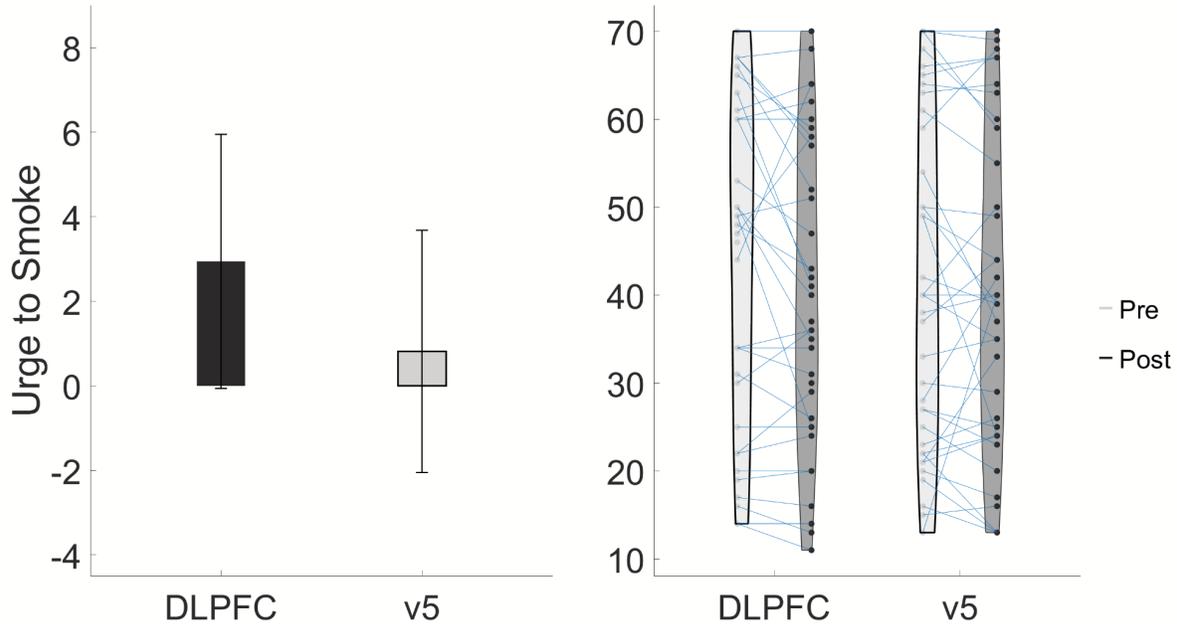


1 Supplemental Materials

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3 Urge to Smoke Results



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6 **Figure S1 Changes in Urge to Smoke (related to Figure 3)** No significant changes in  
 7 Urge to Smoking were found for stimulation to left dIPFC.

Urge to Smoke Measurements			
		dIPFC	v5
UTS	Pre-rTMS	43.74 (20.05)	43.4 (19.54)
	Post-rTMS	41.1 (19.1)	41.7 (18.26)

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9 **Table S1 Urge to Smoke measurements (related to Table 1)** Pre and Post-rTMS to  
 10 both targets showing both their urge to smoke scores before and after treatment.

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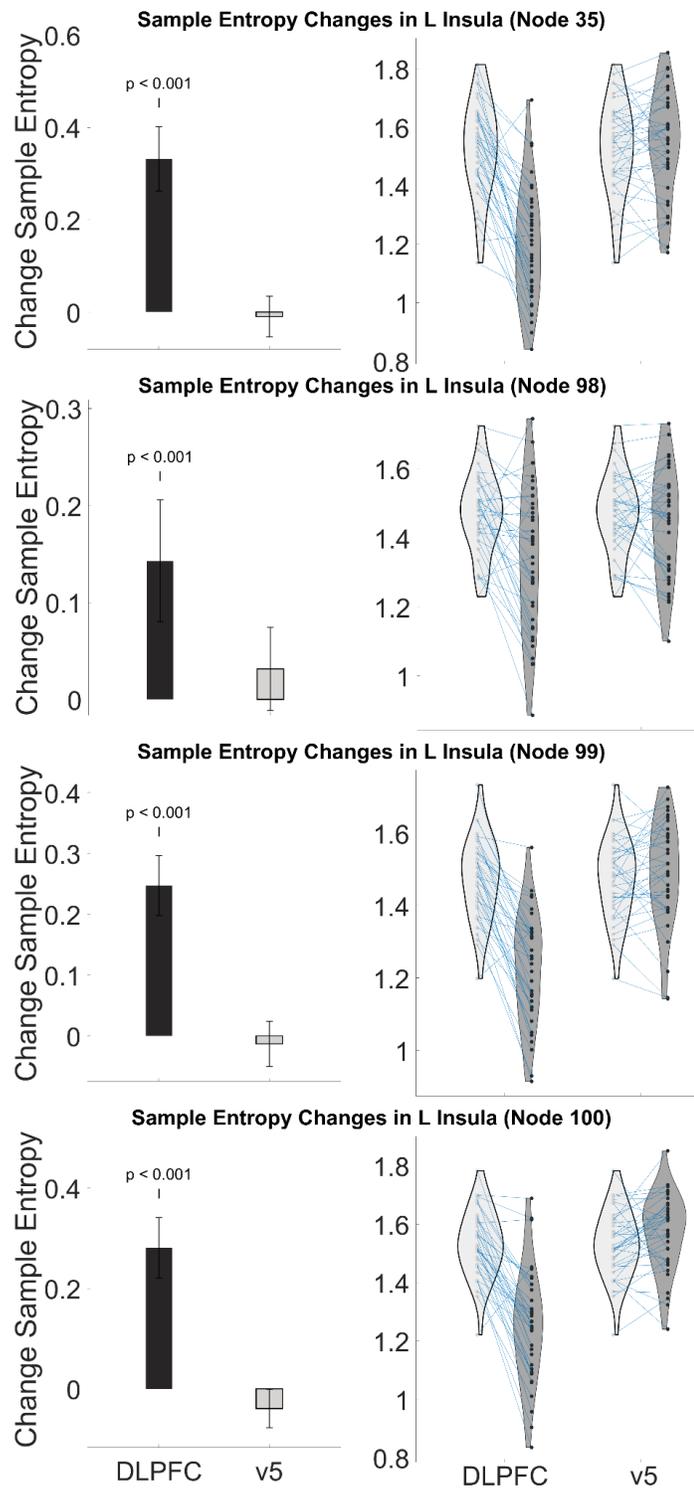
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## Sample Entropy of L/R Insula and left dIPFC nodes

Sample Entropy Pre-rTMS & Post-rTMS			
Schaefer Atlas Node	Time	dIPFC entropy, mean (SD)	V5 entropy, mean (SD)
35 (L Insula)	Pre-rTMS	1.516 (0.159)	1.528 (0.156)
	Post-rTMS	1.191 (0.193)	1.539 (0.17)
98 (L Insula)	Pre-rTMS	1.463 (0.114)	1.466 (0.123)
	Post-rTMS	1.324 (0.199)	1.442 (0.147)
99 (L Insula)	Pre-rTMS	1.464 (0.128)	1.481 (0.109)
	Post-rTMS	1.233 (0.162)	1.493 (0.143)
100 (L Insula)	Pre-rTMS	1.522 (0.119)	1.529 (0.111)
	Post-rTMS	1.246 (0.182)	1.567 (0.127)
143 (L Insula)	Pre-rTMS	1.533 (0.134)	1.553 (0.111)
	Post-rTMS	1.208 (0.141)	1.586 (0.139)
234 (R Insula)	Pre-rTMS	1.563 (0.135)	1.578 (0.12)
	Post-rTMS	1.26 (0.184)	1.586 (0.137)
235 (R Insula)	Pre-rTMS	1.515 (0.13)	1.528 (0.137)
	Post-rTMS	1.22 (0.186)	1.563 (0.151)
236 (R Insula)	Pre-rTMS	1.546 (0.14)	1.564 (0.14)
	Post-rTMS	1.245 (0.197)	1.596 (0.208)
302 (R Insula)	Pre-rTMS	1.596 (0.112)	1.59 (0.119)
	Post-rTMS	1.429 (0.182)	1.617 (0.131)

303 (R Insula)	Pre-rTMS	1.467 (0.113)	1.484 (0.112)
	Post-rTMS	1.347 (0.155)	1.484 (0.121)
304 (R Insula)	Pre-rTMS	1.537 (0.095)	1.544 (0.095)
	Post-rTMS	1.357 (0.158)	1.552 (0.13)
305 (R Insula)	Pre-rTMS	1.517 (0.129)	1.522 (0.129)
	Post-rTMS	1.308 (0.166)	1.567 (0.123)
340 (R Insula)	Pre-rTMS	1.527 (0.137)	1.525 (0.128)
	Post-rTMS	1.379 (0.144)	1.548 (0.141)
137 (L dlPFC)	Pre-rTMS	1.138 (0.129)	1.149 (0.114)
	Post-rTMS	1.083 (0.138)	1.13 (0.147)
138 (L dlPFC)	Pre-rTMS	1.167 (0.142)	1.17 (0.131)
	Post-rTMS	1.097 (0.147)	1.15 (0.134)
139 (L dlPFC)	Pre-rTMS	1.121 (0.105)	1.127 (0.1)
	Post-rTMS	1.088 (0.137)	1.119 (0.127)
140 (L dlPFC)	Pre-rTMS	1.142 (0.134)	1.158 (0.124)
	Post-rTMS	1.094 (0.134)	1.16 (0.119)
141 (L dlPFC)	Pre-rTMS	1.306 (0.146)	1.308 (0.14)
	Post-rTMS	1.152 (0.151)	1.348 (0.155)
142 (L dlPFC)	Pre-rTMS	1.15 (0.153)	1.153 (0.141)
	Post-rTMS	1.11 (0.135)	1.155 (0.124)

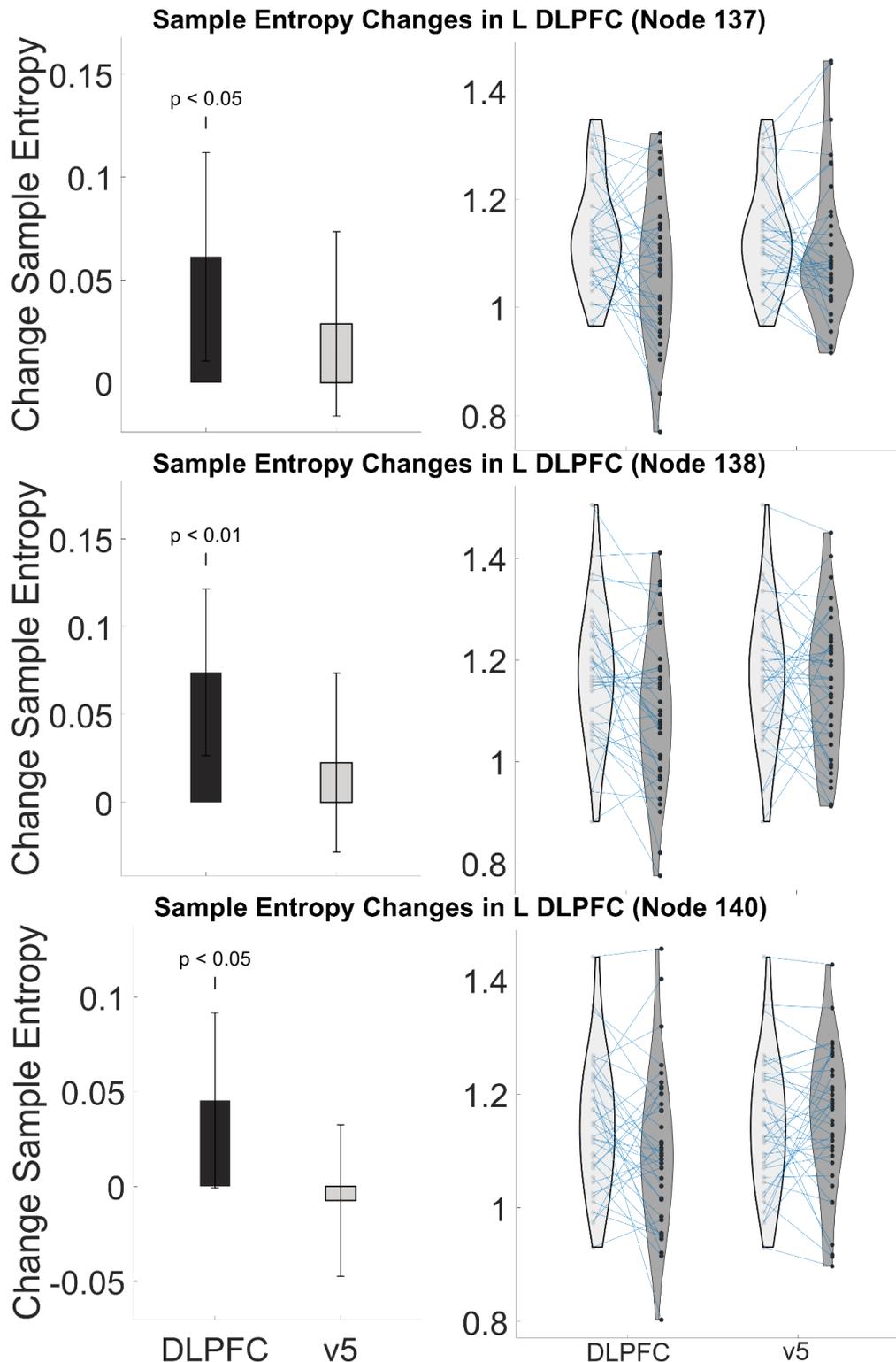
24  
 25 **Table S2 Sample Entropy of each node Pre and Post-rTMS (related to Figure 5)** Sample  
 26 entropy measures for each node found to have significant changes in sample entropy post-  
 27 rTMS to DLPFC. All measures are given as mean measures with standard deviation.



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**Figure S2 Stimulation to left dIPFC reduced sample entropy in left Insula (related to Figure 5)** Plots show change group in sample entropy (left) and individual changes/distribution (right) for each left Insula node. Change values were calculated by subtracting Post-rTMS entropy values from Pre-rTMS values.





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41 **Figure S4 Stimulation to left dIPFC reduced sample entropy in left Insula (related**

42 **to Figure 5) Plots show change group in sample entropy (left) and individual**

43 **changes/distribution (right) for each left dIPFC node. Change values were calculated by**

44 **subtracting Post-rTMS entropy values from Pre-rTMS values.**

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## Confounding Variable Correlations

Sample Entropy across Ethnicity						
Node	Asian (N=5)	Native Hawaiian/ Pacific Islander (N=1)	Black / African American (N=11)	White (N=19)	Hispanic (N=4)	More than One Race (N=2)
35	1.6(0.2)	1.4(0)	1.5(0.2)	1.5(0.2)	1.5(0.1)	1.5(0.1)
98	1.5(0.1)	1.4(0)	1.5(0.1)	1.4(0.1)	1.5(0.1)	1.5(0.1)
99	1.5(0.1)	1.5(0)	1.5(0.1)	1.4(0.1)	1.6(0.1)	1.4(0)
100	1.6(0.1)	1.5(0)	1.5(0.1)	1.5(0.1)	1.5(0.1)	1.5(0)
143	1.6(0.1)	1.6(0)	1.5(0.2)	1.5(0.1)	1.5(0.1)	1.6(0.1)
234	1.6(0.2)	1.5(0)	1.5(0.2)	1.5(0.1)	1.6(0.1)	1.6(0)
235	1.5(0)	1.4(0)	1.5(0.2)	1.5(0.1)	1.5(0)	1.5(0)
236	1.6(0.1)	1.6(0)	1.5(0.1)	1.5(0.2)	1.6(0.1)	1.5(0.1)
302	1.7(0.1)	1.4(0)	1.6(0.1)	1.6(0.1)	1.6(0.1)	1.5(0)
303	1.5(0.1)	1.4(0)	1.5(0.1)	1.4(0.1)	1.5(0.1)	1.5(0.2)
304	1.6(0.1)	1.5(0)	1.5(0.1)	1.5(0.1)	1.6(0.1)	1.5(0)
305	1.6(0.1)	1.4(0)	1.5(0.2)	1.5(0.1)	1.5(0)	1.5(0)
340	1.6(0.1)	1.5(0)	1.5(0.1)	1.5(0.1)	1.6(0.1)	1.6(0.1)
137	1.2(0.2)	1.1(0)	1.1(0.2)	1.1(0.1)	1.1(0)	1.1(0.1)
138	1.3(0.1)	1.3(0)	1.1(0.2)	1.1(0.1)	1.2(0.1)	1.2(0)
139	1.1(0.1)	1.1(0)	1.1(0.1)	1.1(0.1)	1.1(0)	1.1(0)
140	1.2(0.1)	1.1(0)	1.2(0.2)	1.1(0.1)	1.2(0.1)	1.1(0.1)
141	1.4(0.1)	1.4(0)	1.3(0.2)	1.2(0.1)	1.4(0.1)	1.3(0.1)

142	1.3(0.1)	1.2(0)	1.1(0.2)	1.1(0.1)	1.3(0.1)	1.1(0.1)
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48 **Table S3 No significant differences in Pre-rTMS entropy between ethnicities**  
 49 Ethnic groups were compared for Pre-rTMS sample entropy measures to determine if  
 50 there were significant differences. No significant differences were found for any of the  
 51 nodes. This table shows how many participants in each ethnic group were included in  
 52 this study and their group's mean sample entropy with standard deviation for each  
 53 node.

54

Node	Age		Years of Smoking		Education Level	
	r	p	r	p	r	p
35	0.03	0.83	0.03	0.84	0.00	0.98
98	0.18	0.26	0.18	0.27	-0.22	0.16
99	0.05	0.76	0.12	0.45	0.05	0.74
100	0.15	0.34	0.14	0.36	0.05	0.77
143	0.15	0.36	0.13	0.40	0.17	0.28
234	-0.01	0.95	-0.01	0.97	-0.07	0.66
235	0.03	0.87	0.02	0.88	-0.06	0.70
236	0.00	0.99	0.00	0.98	0.07	0.64
302	-0.07	0.67	-0.13	0.42	0.25	0.11
303	0.03	0.85	0.12	0.45	-0.19	0.22
304	0.18	0.26	0.24	0.13	0.07	0.65
305	-0.06	0.72	-0.05	0.77	-0.29	0.06
340	0.23	0.14	0.16	0.31	0.03	0.84
137	0.12	0.46	0.09	0.59	-0.16	0.32
138	0.08	0.60	0.08	0.62	-0.16	0.30
139	0.16	0.30	0.20	0.21	-0.25	0.10
140	-0.01	0.95	-0.03	0.87	-0.19	0.24
141	0.13	0.39	0.21	0.19	0.17	0.27

142	0.21	0.19	0.09	0.55	0.05	0.77
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55 **Table S4 No significant correlations between Pre-rTMS entropy and confounding**  
 56 **variables** Pearson correlations for three confounding variables (age, years of smoking,  
 57 and education) were calculation for Pre-rTMS sample entropy measures to determine if  
 58 there were significant correlations. No correlations were found for any of the nodes for  
 59 any of the variables. This table shows the pearson correlation coefficient (r) and the p-  
 60 value of each coefficient for each variable with pre-rTMS sample entropy measures.

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## 62 Exploratory Findings Entropy Results

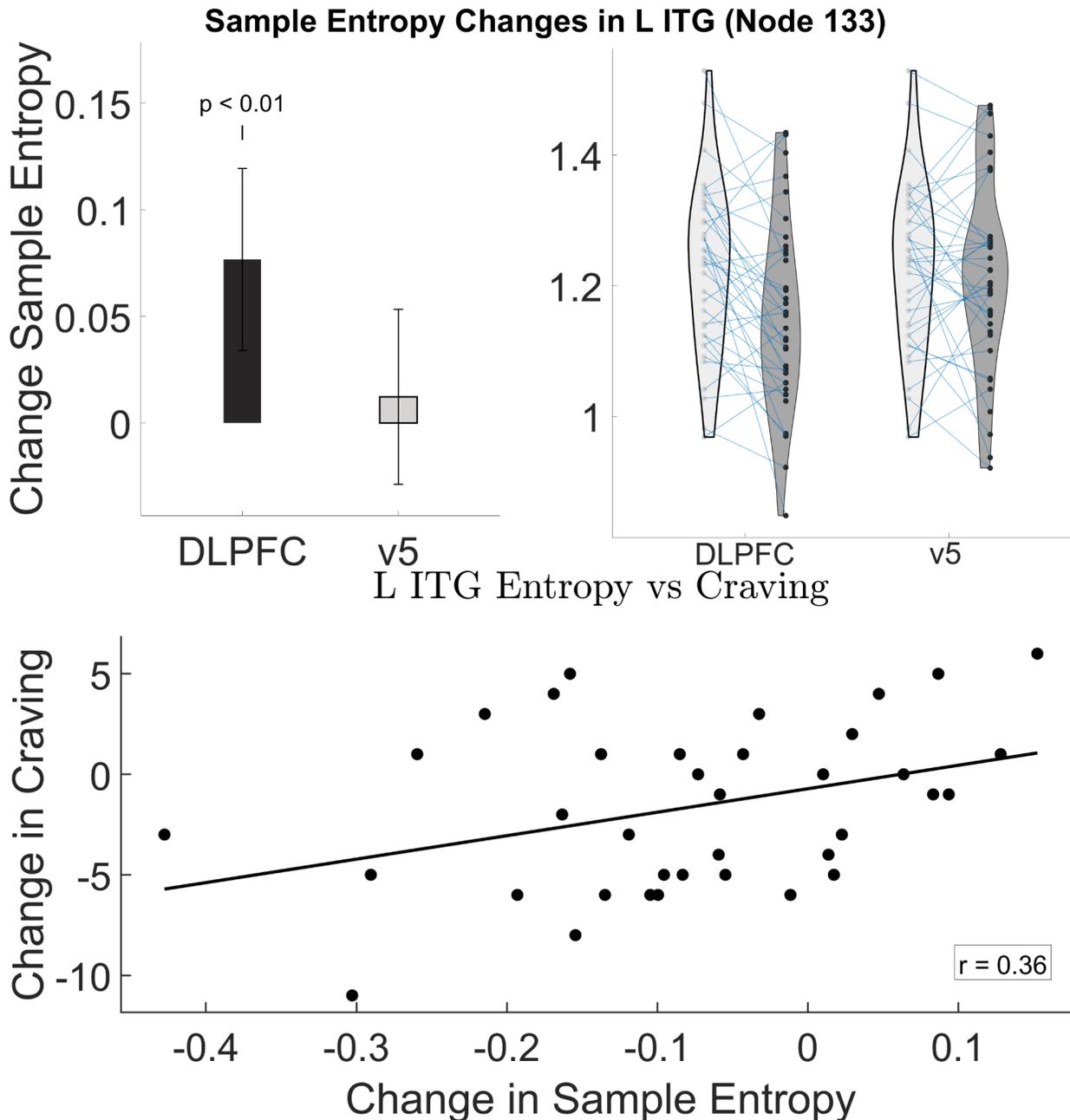
63

Sample Entropy Pre-rTMS & Post-rTMS			
Schaefer Atlas Node	Time	dIPFC entropy, mean (SD)	V5 entropy, mean (SD)
133 (L ITG)	Pre-rTMS	1.21 (0.14)	1.23 (0.13)
	Post-rTMS	1.14 (0.14)	1.22 (0.14)
314 (R SFG)	Pre-rTMS	1.36 (0.14)	1.37 (0.14)
	Post-rTMS	1.21 (0.17)	1.4 (0.16)
318 R SFG)	Pre-rTMS	1.32 (0.17)	1.32 (0.17)
	Post-rTMS	1.22 (0.18)	1.31 (0.17)

64

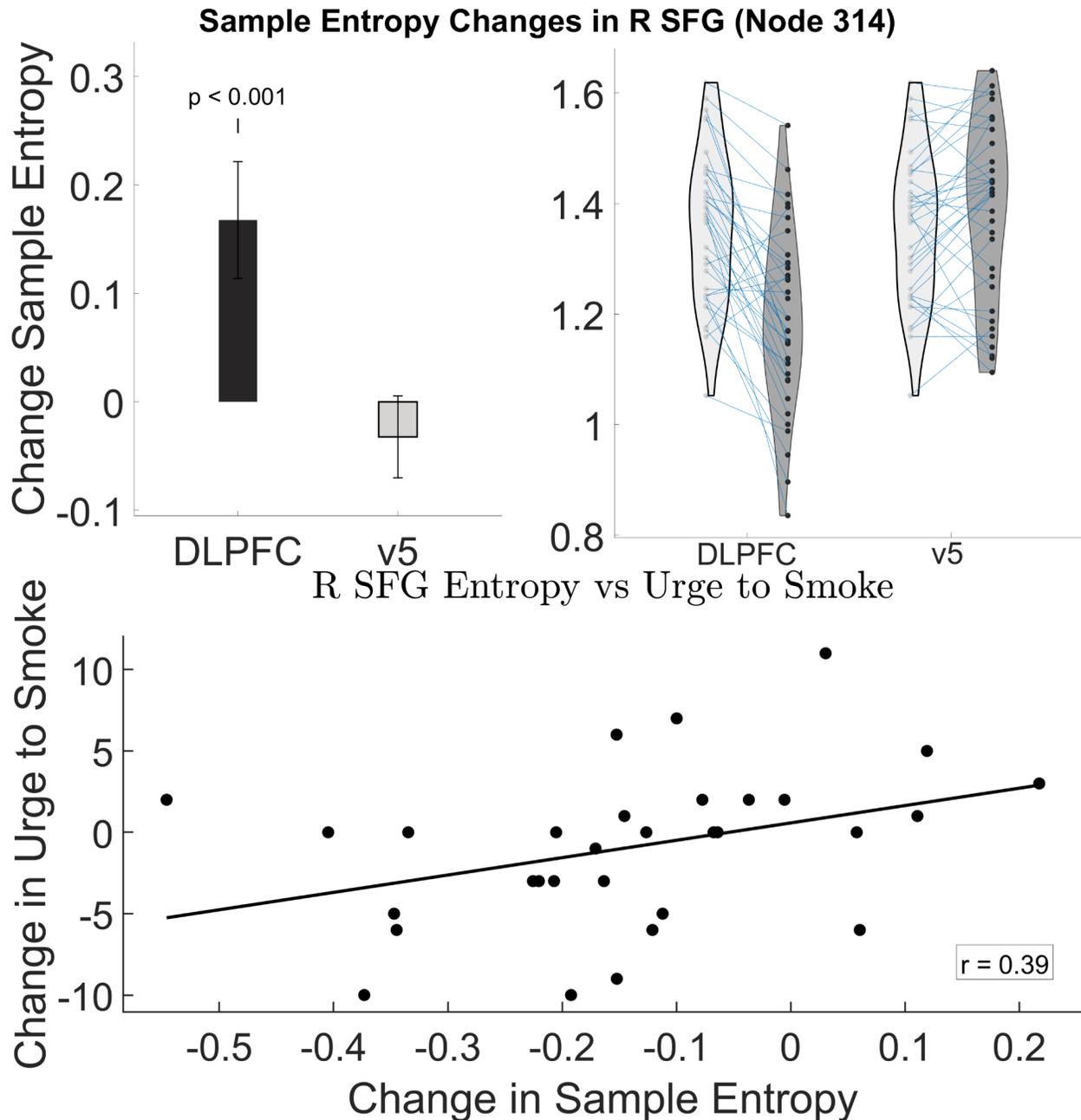
65 **Table S5 Sample Entropy of each exploratory node Pre and Post-rTMS (related to Figure**  
 66 **7)** Sample entropy measures for each node found to have significant changes in sample  
 67 entropy post-rTMS to DLPFC. All measures are given as mean measures with standard  
 68 deviation.

69



71 **Figure S5 Stimulation to left dIPFC reduced sample entropy in left Inferior**  
72 **Temporal Gyrus (ITG) (related to Figure 7) Top:** Plots show change group in sample  
73 entropy (left) and individual changes/distribution (right) for this node and the region that  
74 correlated with the node. Change values were calculated by subtracting Post-rTMS  
75 entropy values from Pre-rTMS values. **Bottom:** Correlation plot between changes in  
76 sample entropy in left ITG and craving ( $r=0.36$ ,  $p= 0.027$ ) as measured by the Shiffman-  
77 Jarvik Withdrawal Scale (SJWS) subscale for craving.

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80 **Figure S6 Stimulation to left dIPFC reduced sample entropy in right superior**

81 **frontal gyrus (SFG)Top:** Plots show change group in sample entropy (left) and

82 individual changes/distribution (right) for this node and the region that correlated with

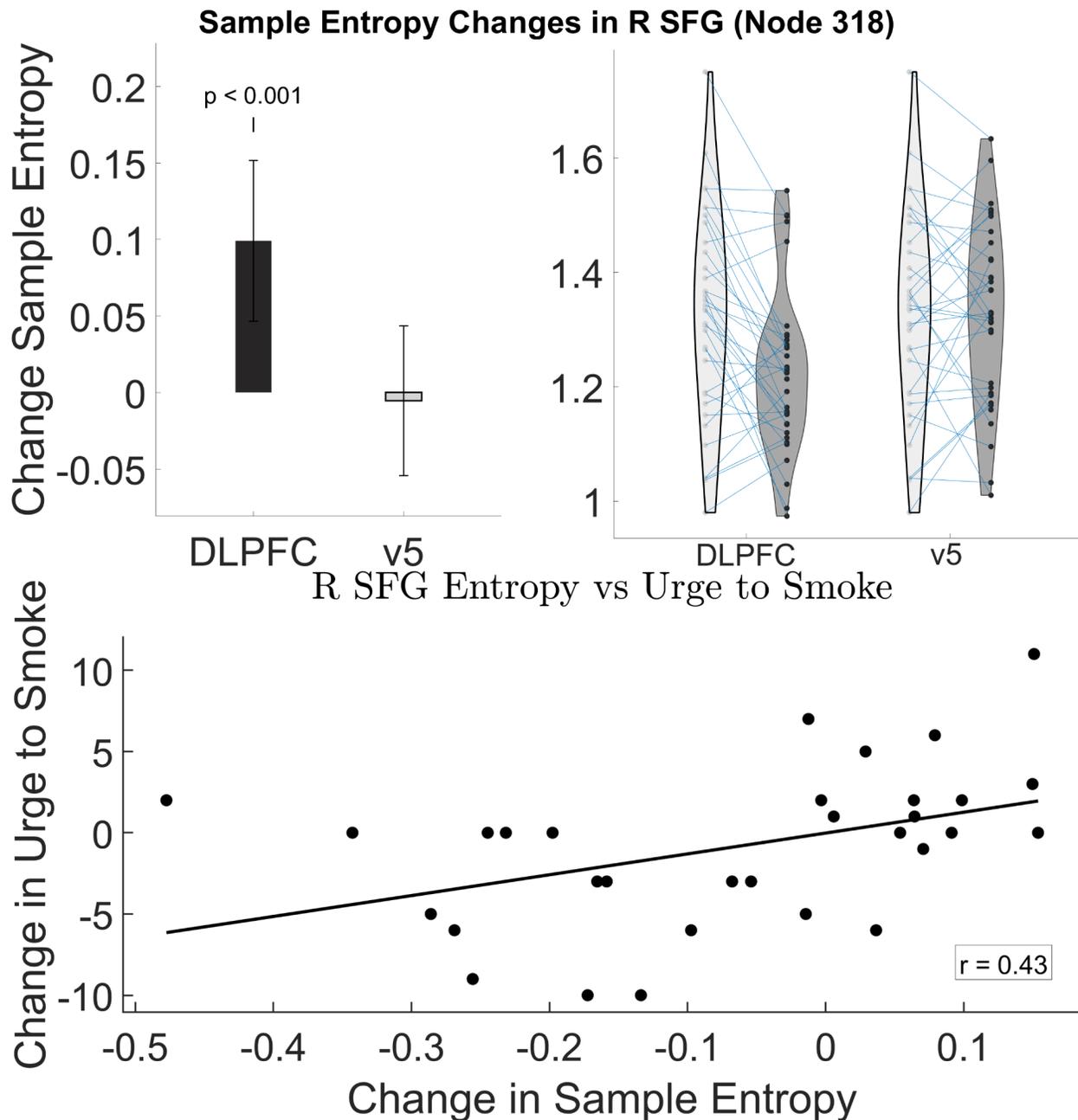
83 the node. Change values were calculated by subtracting Post-rTMS entropy values from

84 Pre-rTMS values. **Bottom:** Correlation plot between changes in sample entropy in right

85 SFG and craving ( $r=0.39$ ,  $p= 0.025$ ) as measured by the Shiffman-Jarvik Withdrawal

86 Scale (SJWS) subscale for craving.

87



88

89 **Figure S7 Stimulation to left dIPFC reduced sample entropy in right superior**  
90 **frontal gyrus (SFG) Top:** Plots show change group in sample entropy (left) and  
91 individual changes/distribution (right) for this node and the region that correlated with  
92 the node. Change values were calculated by subtracting Post-rTMS entropy values from  
93 Pre-rTMS values. **Bottom:** Correlation plot between changes in sample entropy in right  
94 SFG and craving ( $r=0.43$ ,  $p= 0.016$ ) as measured by the Shiffman-Jarvik Withdrawal  
95 Scale (SJWS) subscale for craving.