	NKI				NYSPI/CU			
	Schizophrenia	Control	Att. Psych.	Young control	Schizophrenia	Control	APS	Young control
	(N=35)	(N=25)	(N=15)	(N=11)	(N=28)	(N=19)	(N=17)	(N=12)
Age	41.5 (10.6)	34.7 (7.4)	22.3 (3.1)	23.5 (4.2)	40.9 (12.0)	31.9 (7.5)	21.5 (4.2)	25.3 (4.5)
Gender (F/M)	5/30	7/18	8/7	8/3	8/20	7/12	4/13	4/8
Years of Education	11.1 (2.0)	14.4 (1.9)	13.1 (2.1)	15.0 (1.8)	13.8 (2.6)	14.9 (1.9)	13.1 (2.2)	15.8 (2.3)
Quick IQ	99.5 (8.0)	100.0 (9.6)	99.6 (7.3)	106.3 (8.7)	95.9 (9.6)	104.9 (12.5)	94.9 (18.8)	103.3 (12.4)
Participant SES	22.9 (7.2)	39.6 (12.2)	31.8 (12.4)	39.4 (13.0)	27.1 (10.7)	33.9 (11.4)	31.8 (12.4)	40.7 (12.8)
Parental SES	40.5 (13.6)	45.3 (16.9)	45.6 (11.7)	46.7 (15.5)	39.9 (14.8)	43.6 (14.1)	45.6 (11.7)	49.4 (12.8)
Illness Duration (yrs)	19.2 (8.9)	--	--	--	21.7 (9.9)	--	--	--
CPZ Equiv.	984.8 (793)	--	--	--	447.5 (461)	--	--	--
ER40	26.9 (5.1)	34.9 (2.4)	33.0 (2.5)	35.9 (1.6)	29.2 (2.3)	34.9 (2.3)	34.8 (3.1)	33.5 (2.6)
PANSS (positive)	12.6 (4.0)	--	--	--	11.1 (4.7)	--	--	--
PANSS (negative)	17.3 (5.5)	--	--	--	12.7 (3.7)	--	--	--
SIPS/SOPS (positive)	--	--	12.4 (4.6)	--	--	--	15.5 (3.1)	--
SIPS/SOPS (negative)	--	--	15.6 (6.8)	--	--	--	19.3 (5.3)	--
SIPS/SOPS (disorganization)	--	--	9.9 (4.0)	--	--	--	14.7 (4.1)	--
SIPS/SOPS (general)	--	--	10.5 (3.9)	--	--	--	11.7 (3.1)	--
MATRICS (SoP)	28.1 (12.6)	--	--	--	38.2 (8.7)	--	43.2 (11.9)	--
MATRICS (AV)	31.1 (11.3)	--	--	--	40.1 (14.9)	--	42.6 (9.7)	--
MATRICS (WM)	31.8 (12.8)	--	--	--	40.4 (11.2)	--	43.9 (9.4)	--
MATRICS (VerL)	33.3 (5.6)	--	--	--	40.4 (7.7)	--	45.8 (8.2)	--
MATRICS (VisL)	35.2 (15.6)	--	--	--	38.1 (10.8)	--	45.6 (8.8)	--
MATRICS (RPS)	36.7 (9.2)	--	--	--	44.0 (12.1)	--	41.2 (11.5)	--

Supplementary Table 1: Mean (sd) demographics and clinical measures by testing site. NKI, Nathan Kline Institute; NYSPI/CU, New York State Psychiatric Institute at Columbia University; Att. Psych., attenuated psychosis; SES, socioeconomic status; CPZ, chlorpromazine equivalents; ER40, Penn Emotion Recognition Task-40 Faces, PANSS, Positive and Negative Scale for Schizophrenia; SIPS/SOPS, Structured Interview for Prodromal Syndromes/Scale of Prodromal Symptoms; MATRICS domains: SoP, Speed of Processing; AV, Attention Vigilance; WM, Working Memory. VerL, Verbal Learning, VisL, Visual Learning; RPS, Reasoning and Problem Solving.

	fMRI Participants	
	Schizophrenia	Control
	(N=21)	(N=16)
Age	38.9 (11.4)	34.0 (7.8)
Gender (F/M)	5/16	5/11
Years of Education	11.7 (2.6)	13.8 (2.2)
Quick IQ	98.1 (9.7)	101.3 (8.6)
Participant SES	24.8 (7.9)	37.1 (15.1)
Parental SES	40.0 (12.9)	37.6 (17.5)
Illness Duration (yrs)	20.3 (9.4)	--
CPZ Equiv.	894.8 (689)	--
ER40	26.9 (5.8)	34.9 (2.2)
PANSS (positive)	12.2 (4.1)	--
PANSS (negative)	17.3 (5.5)	--
MATRICS (SoP)	29.6 (10.9)	--
MATRICS (AV)	31.8 (10.0)	--
MATRICS (WM)	33.4 (11.9)	--
MATRICS (VerL)	33.2 (5.4)	--
MATRICS (VisL)	38.8 (16.5)	--
MATRICS (RPS)	35.8 (10.1)	--

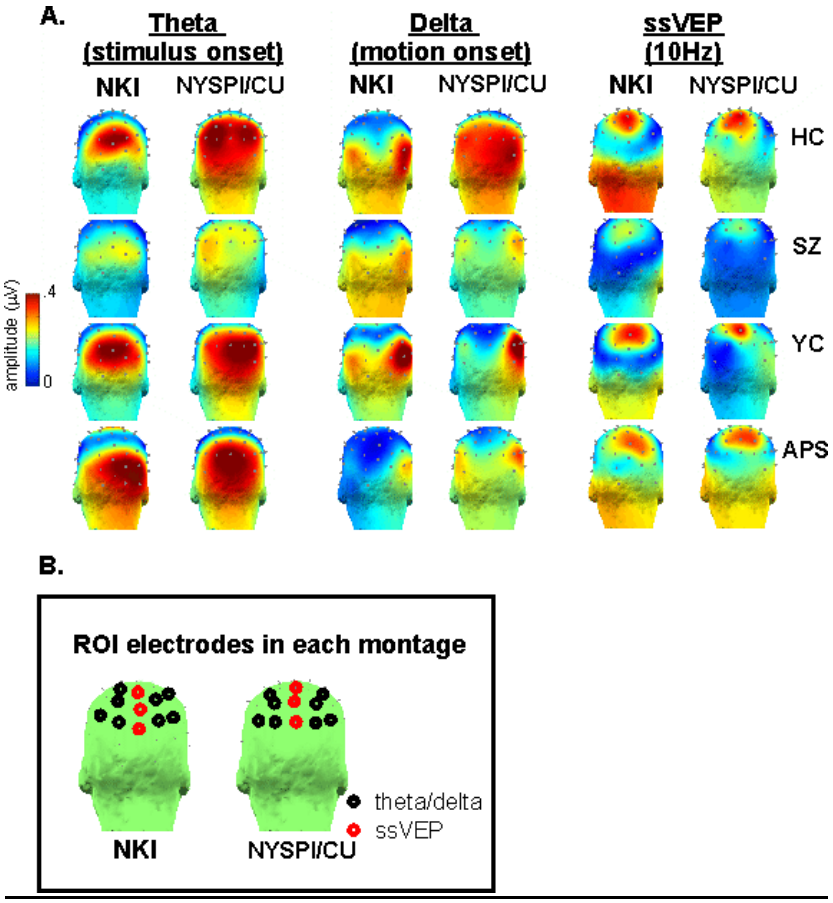
Supplementary Table 2: Mean (sd) demographics and clinical measures of fMRI participants. All fMRI participants were recruited from the NKI site. Abbreviations are as in Supplementary Table 1.

Measure	Stimulus	Group (LH/RH)				Main Effects					Interactions with CS			
		HC	SZ	YC	APS	CS	A	TS	S	H	CSxA	CSxTS	CSxS	CSxH
Delta Amplitude (∝V)	LSF low	.32/.59	.22/.43	.34/.68	.27/.37	17.66	0.006	3.74	26.3	154.65	0.779	0.011	3.45	16.94
	LSF high	.25/.44	.17/.32	.24/.47	.24/.27	p-value					p-value			
	HSF	.27/.46	.23/.37	.27/.52	.21/.30	*<.0001*	0.937	0.055	*<.0001*	*<.0001*	0.379	0.915	0.034	*<.0001*
Theta Amplitude, (∝V)	LSF low	.41/.41	.32/.32	.37/.41	.45/.46	0.27	4.99	0.013	8.79	6.36	9.14	0.017	0.760	2.03
	LSF high	.39/.29	.29/.27	.36/.40	.39/.42	p-value					p-value			
	HSF	.42/.52	.37/.36	.42/.45	.52/.57	.606	*.027*	0.911	*.0002*	*.013*	*0.003*	.898	0.47	.157
ssVEP (FFT Power)	LSF low	1.6E-03	6.9E-04	1.2E-03	1.7E-03	2.20	0.231	0.007	9.78	--	6.20	1.72	0.384	--
	LSF high	1.1E-03	3.3E-04	8.1E-04	8.6E-04	p-value					p-value			
	HSF	1.8E-03	7.7E-04	1.2E-03	1.3E-03	.140	.631	0.932	*.0001*	--	*0.014*	.192	0.682	--

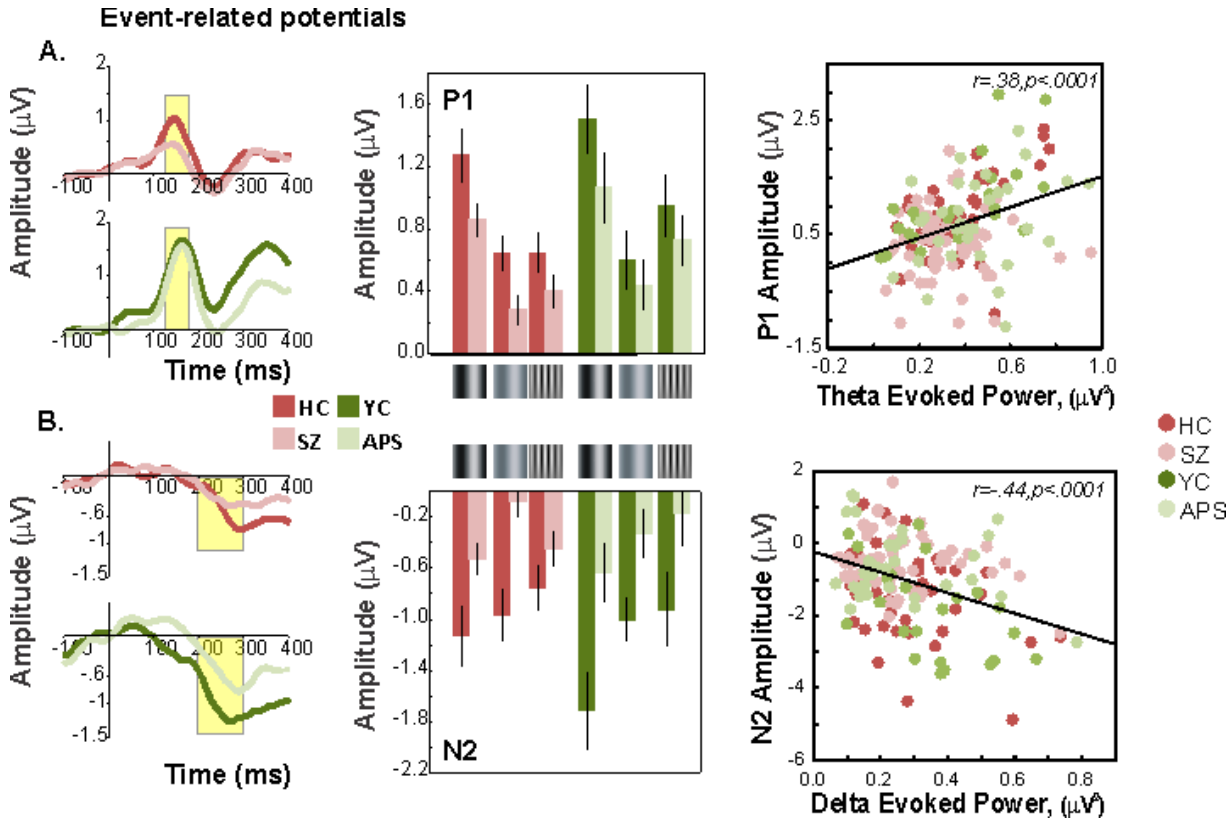
Supplementary Table 3: (left panel) Evoked amplitude for delta (top rows) and theta (middle rows) and FFT power at 10Hz for ssVEP stimuli (bottom rows) as a function of group membership; (HC, controls matched to schizophrenia (SZ) patients, YC, younger controls matched to attenuated psychosis (APS) individuals) and stimulus type (LSF low: low spatial frequency (SF), low contrast; LSF high: low SF, high contrast; HSF: high SF). Delta and theta amplitude measured over the left and right hemispheres (LH/RH) are provided separately. Middle panel shows main effects (F and p values) from repeated measures MANOVA with between-subject factors of clinical status (CS: SZ/APS vs. HC/YC), Age group (A: older, younger) and testing site (TS: NKI/NYSPI) and within-subject factors of stimulus type (S) and hemisphere (H). All interactions with clinical status are shown in right panel.

Brain Region	x	y	z	Volume (mm^3)	F(1,35)	p
RH MT+	50	-58	1	3225	7.8	0.008
LH MT+	-50	-62	-2	315	4.1	0.051
LH Fusi.	-37	-49	-17	1795	11.2	0.002
RH IPL	50	-37	43	585	13.6	<.001
RH Precun.	27	-71	23	315	4.9	0.035
RH MFG	34	30	33	860	9.5	0.004
RH Calc.	13	-75	11	660	5.23	0.028
LH MOG	-30	-81	1	315	27.44	<.001
RH STG	56	-52	13	315	20.39	<.001
LH Pulvinar	-11	-25	3	156	20.62	<.001

Supplementary Table 4: Regions of Interest identified by fMRI. Left (LH) and right (RH) hemisphere cortical areas activated by moving vs. static stimuli. The Tailarach coordinates of the center of mass and the total volume of each ROI is given, as are F and p values for the statistical comparison of activation in schizophrenia patients vs. healthy controls. (Fusi., fusiform gyrus; IPL, inferior parietal lobe; Precun., precuneus; MFG, middle frontal gyrus; Calc., calcarine fissure; MOG, middle occipital gyrus; STG, superior temporal gyrus).



Supplementary Figure 1: A. Scalp topographies. Topographical scalp maps of theta (4-7Hz; actual frequencies: 3.97, 4.69, 5.54, 6.54, 6.91Hz) (left) and delta (middle) (1-4Hz; actual frequencies: 1.17, 1.55, 2.04, 2.69, 3.55Hz) amplitude (in microvolts) evoked by stimulus onset and stimulus motion, respectively. FFT power at 10Hz evoked by the ssVEP stimulus is shown in right column. In all cases, data is for the average of all stimulus types averaged across each group (HC, older controls; SZ, schizophrenia patients; YC, younger controls; APS, attenuated psychosis) for each recruitment site (NKI, NYSPI). Topographical maps are of the latency interval used for statistical testing (see Methods). B. Electrode montages. Common electrodes in the NKI (Advanced Neuro Technology) and NYSPI/CU (Brainvision) 64-channel montages used for statistical testing. Theta and delta amplitude were each measured over 8 occipital electrode sites (4 per hemisphere, O1/O2, PO3/PO4, P3/P4, PO7/PO8) denoted in by black circles. ssVEP power at 10Hz was measured and tested across 3 mid-occipital electrodes (red circles) (Oz, Pz, POz).



Supplementary Figure 2: A. Event-related potentials (ERP) to stimulus onset (top) Stimulus onset (averaged over all three types of gratings) elicited a P1 component that was significantly reduced in amplitude (microvolts, μV) in patients with schizophrenia (SZ) (pink tracings) compared to healthy control (HC) subjects (red tracings) ($F(1,105)=14.53$, $p<.001$). In contrast, P1 amplitude did not differ significantly between attenuated psychosis individuals (APS) and younger controls (YC) ($F(1,53)=1.67$, $p=.2$). Group-averaged ERP waveforms, averaged across stimulus types, are shown from a RH occipital scalp site (O2). Yellow rectangles indicate the latency window (120-150ms, post stimulus-onset) used for statistical testing. Bar plots on right are of P1 amplitude for each stimulus type during the same latency window. Error bars are of standard deviation of the mean. Across all subjects, mean P1 amplitude was significantly correlated with theta (4-7Hz) amplitude (average of all stimuli)

(scatterplot on right). B. Event-related potentials to motion-onset. Motion onset elicited a broad negativity (N2) which was significantly reduced both in SZ patients compared to HC ($F(1,105)=11.57$, $p<.001$) and in APS vs. YC ($F(1,53)=7.74$, $p=.007$) during the latency interval of 200-300ms post motion onset (yellow rectangle). ERP waveforms are from an occipital electrode site (PO8) in the RH, collapsed across all stimulus types. N2 amplitude over the same latency window is shown on right for each stimulus type. In the frequency domain, the N2 component significantly correlated with delta (1-4Hz) (scatterplot on right).