

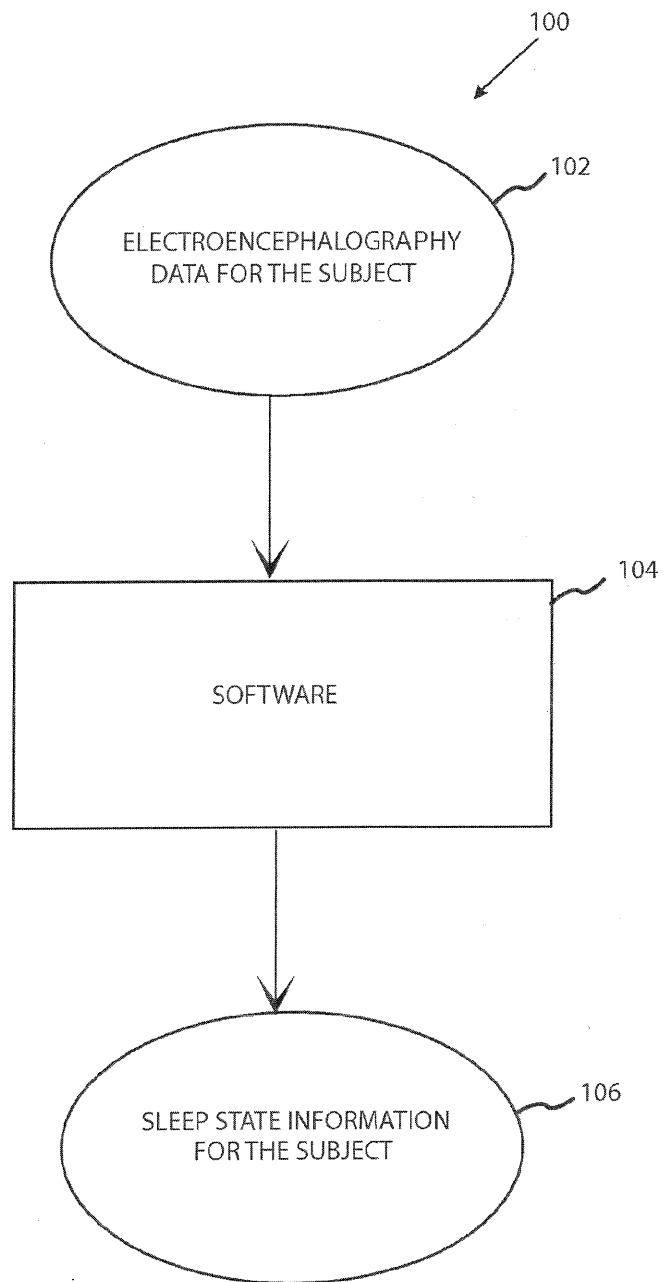


FIG. 1

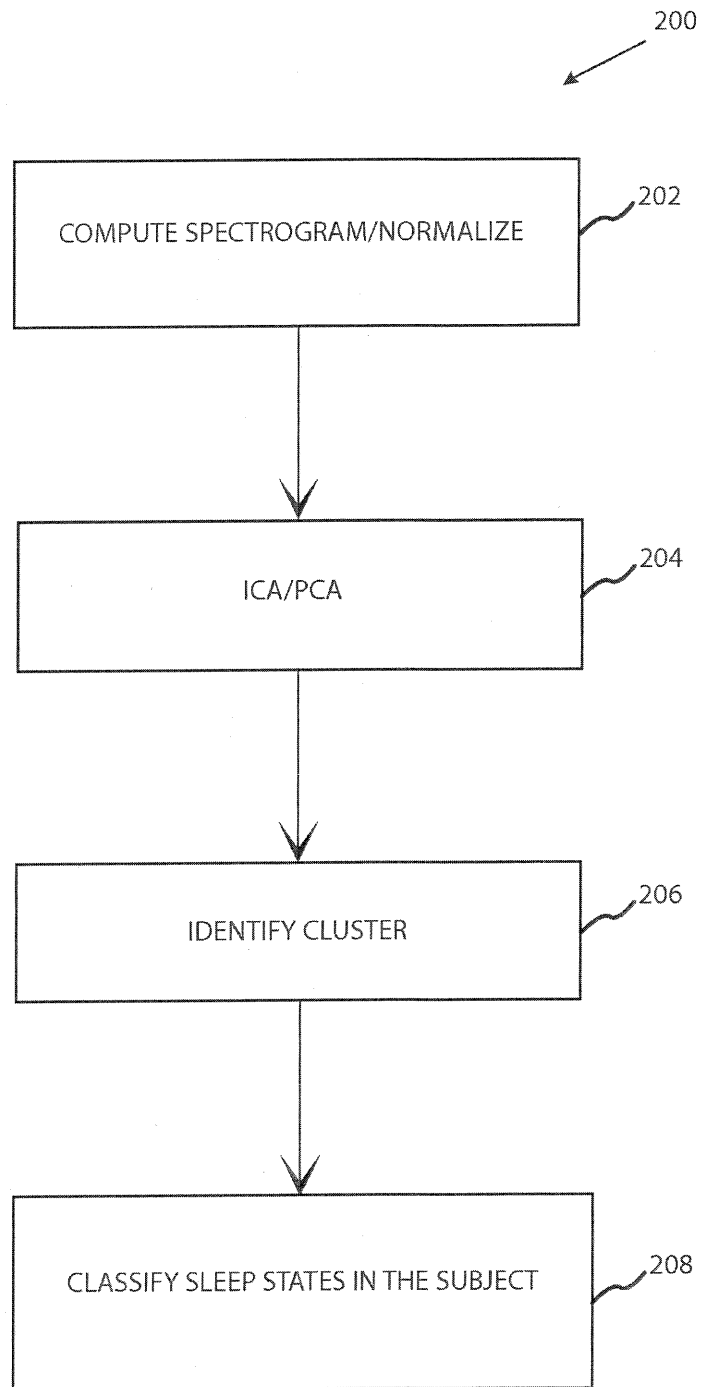


FIG. 2

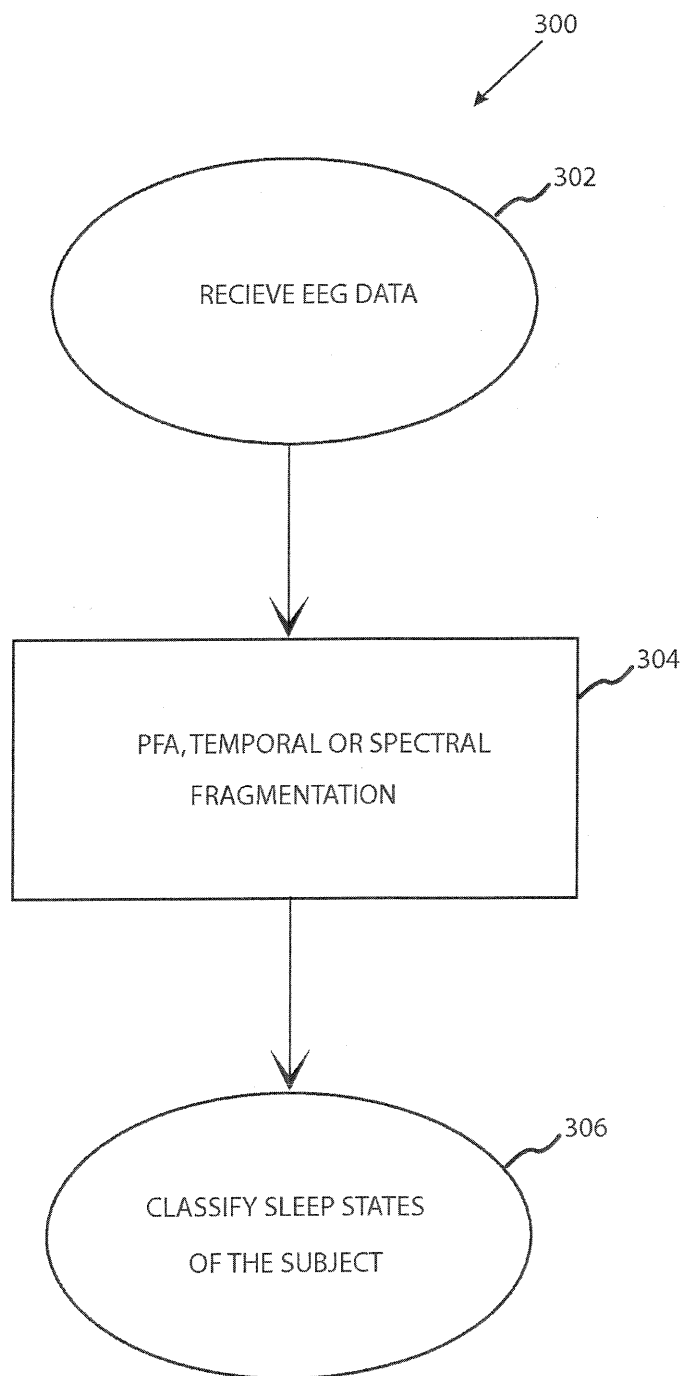


FIG. 3

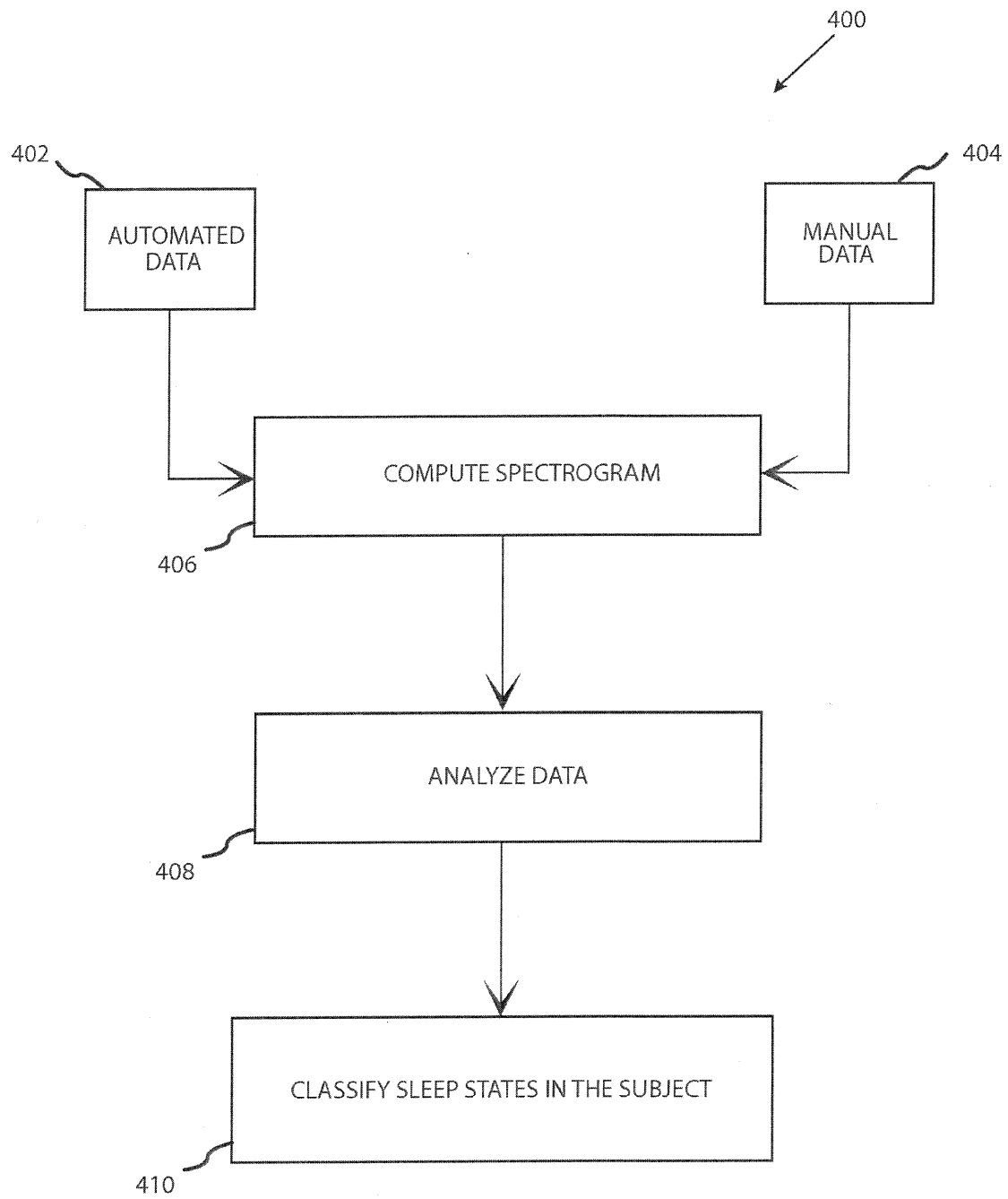


FIG. 4

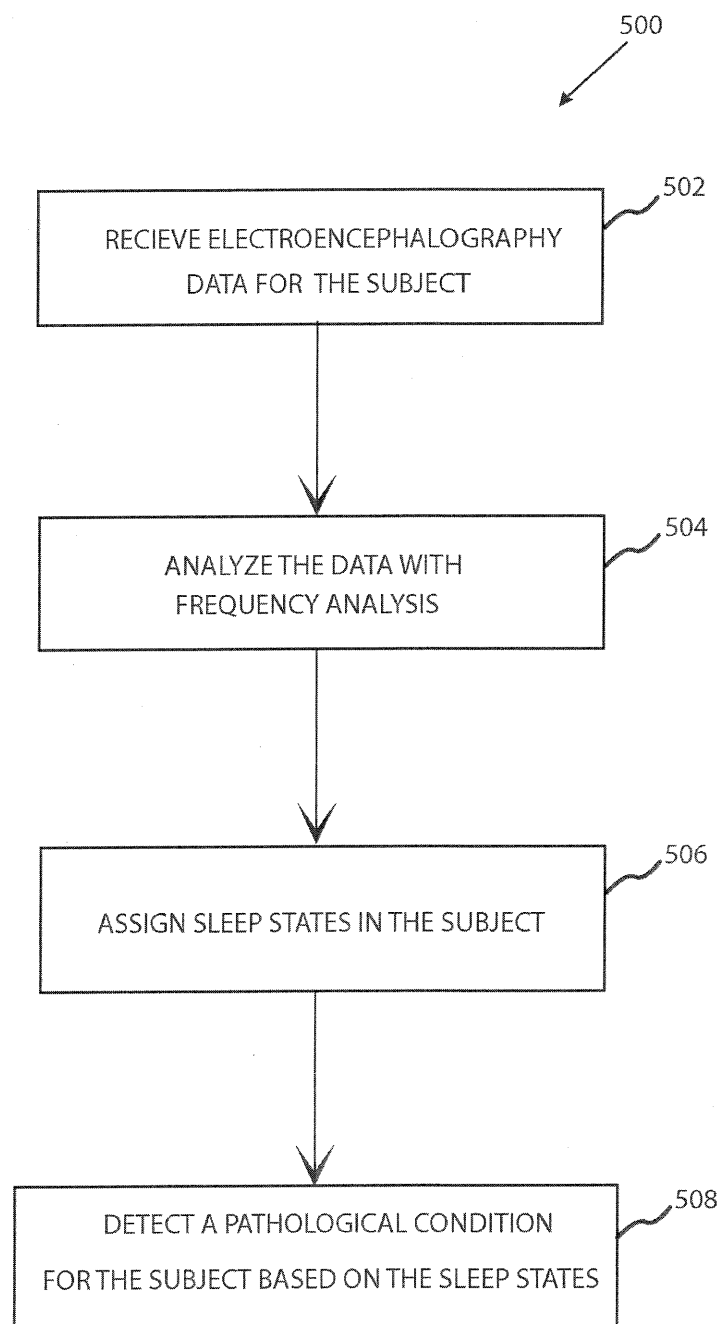


FIG. 5

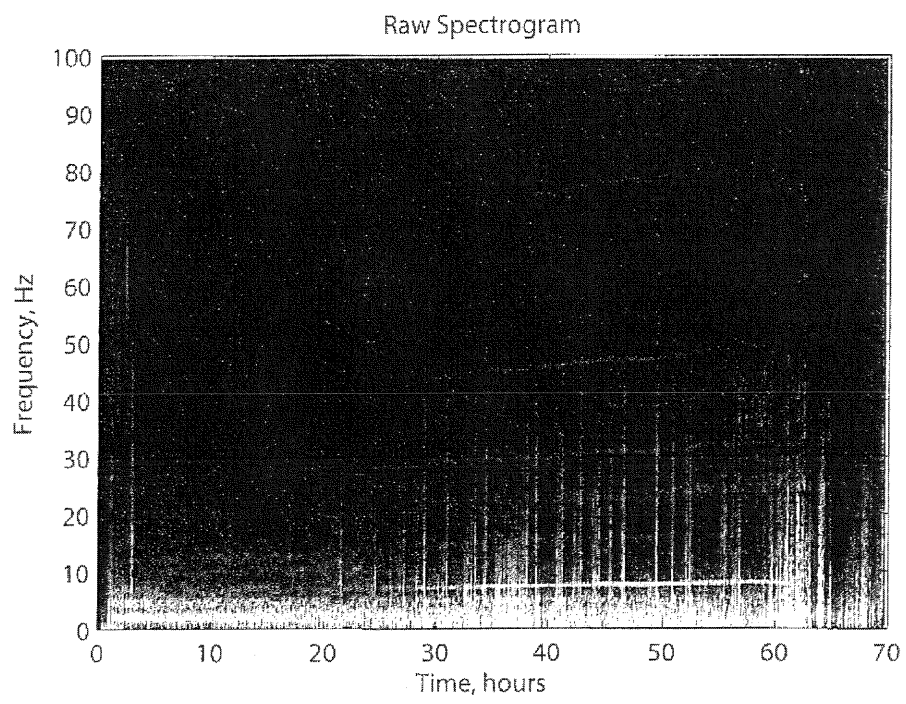


FIG. 6

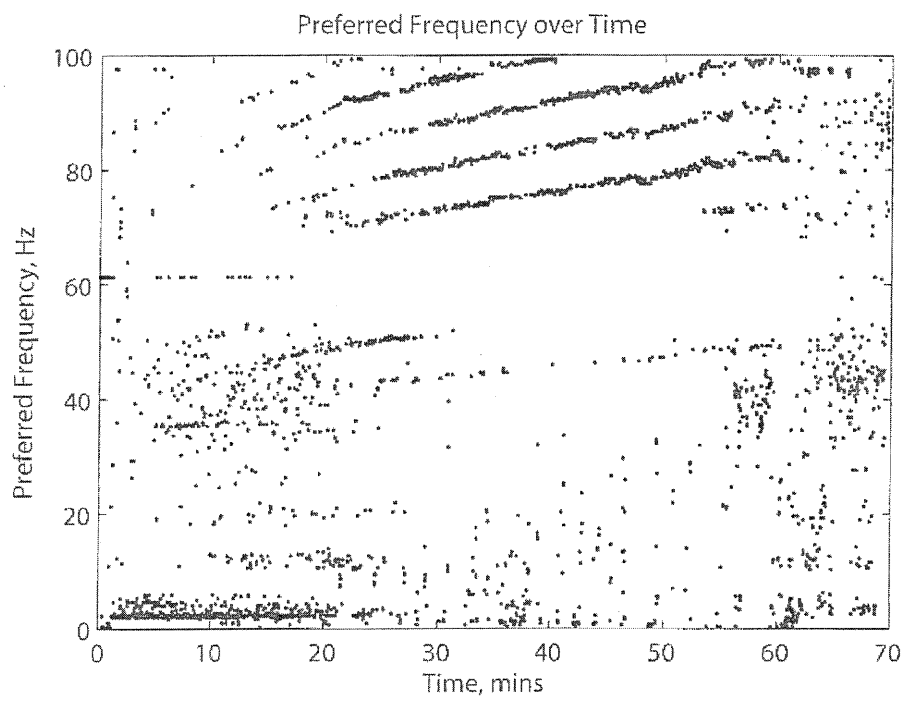


FIG. 7

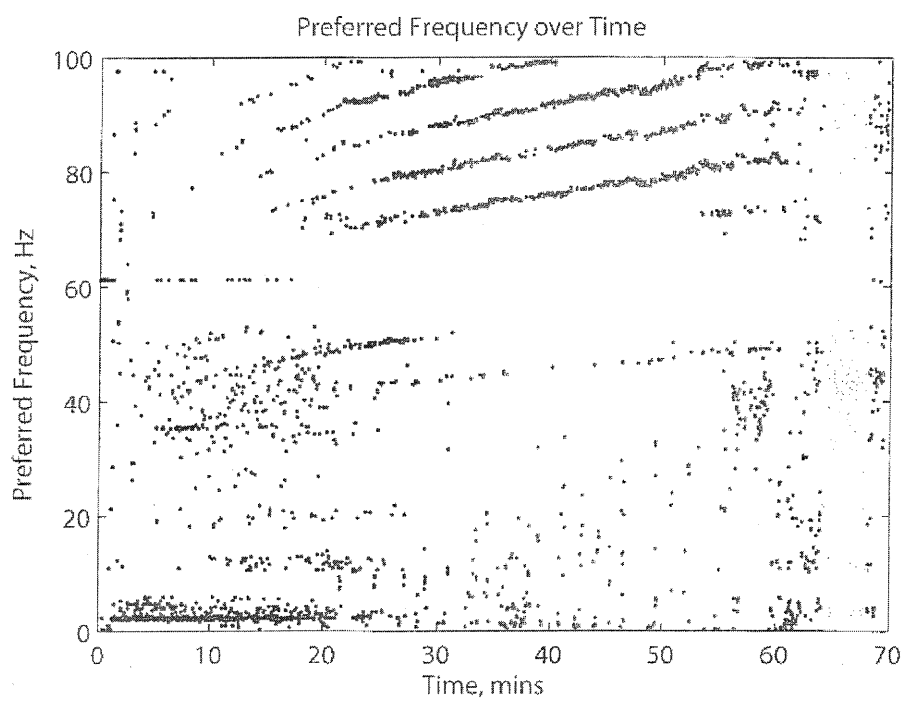


FIG. 8

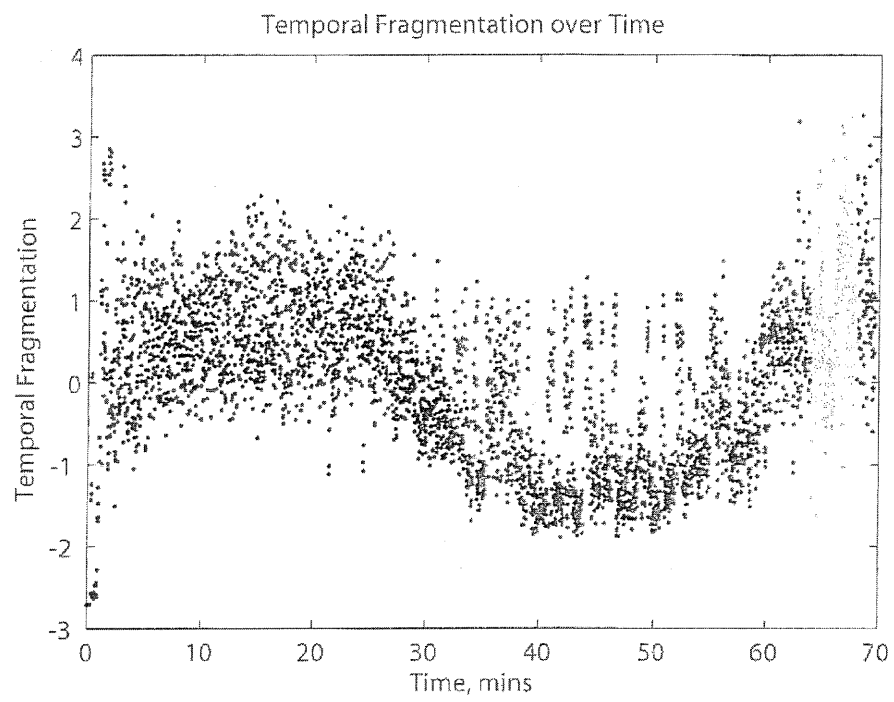


FIG. 9

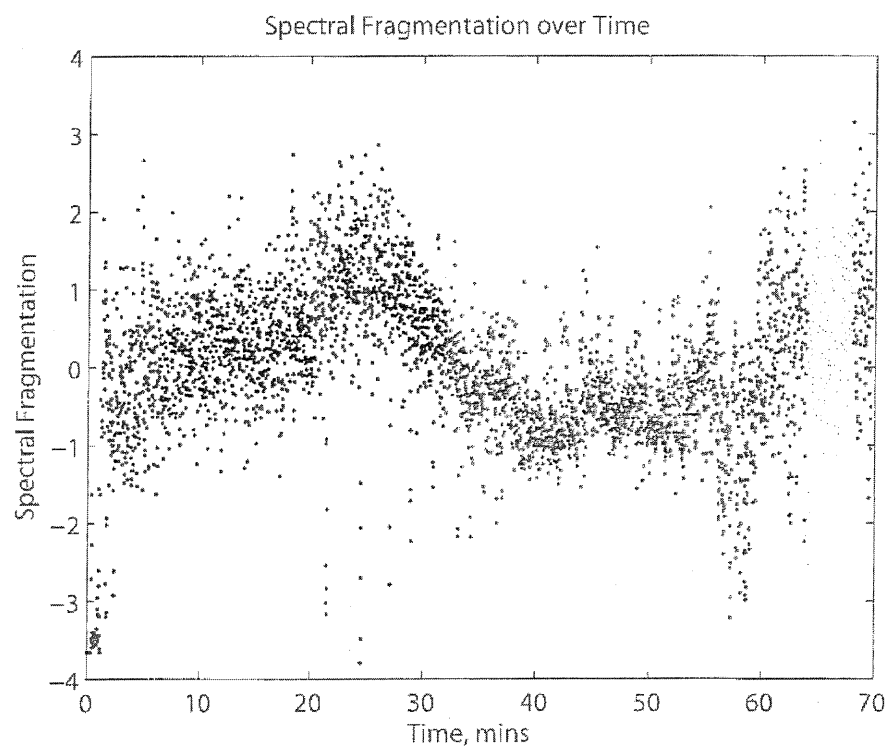


FIG. 10

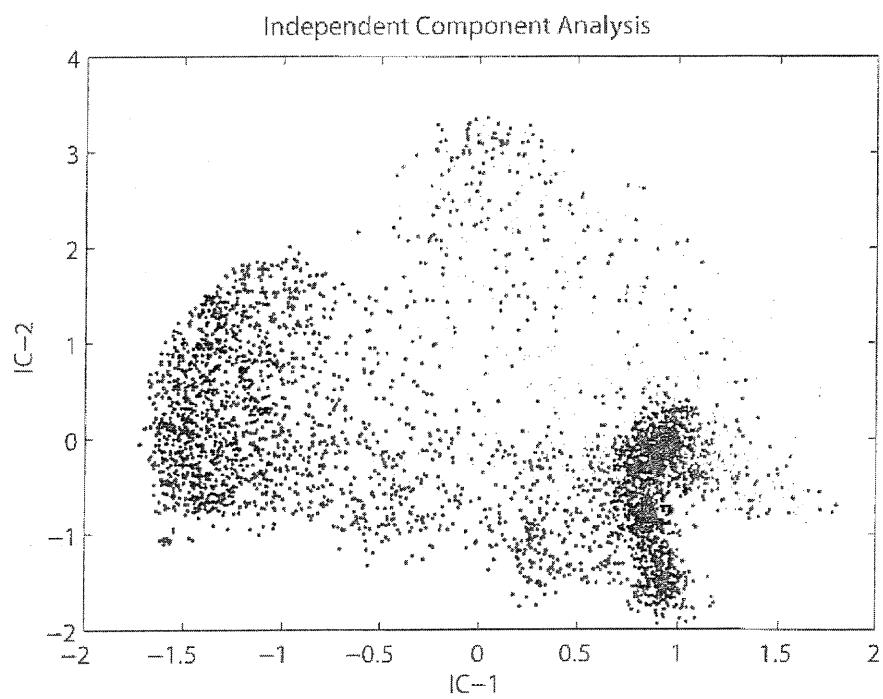


FIG. 11

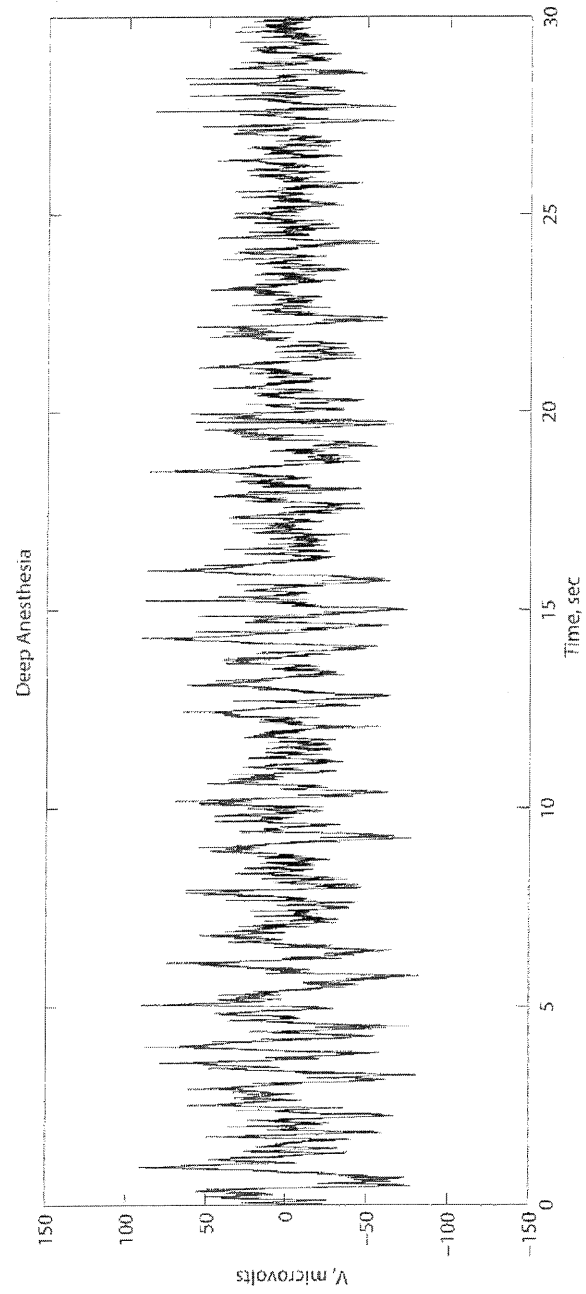


FIG. 12

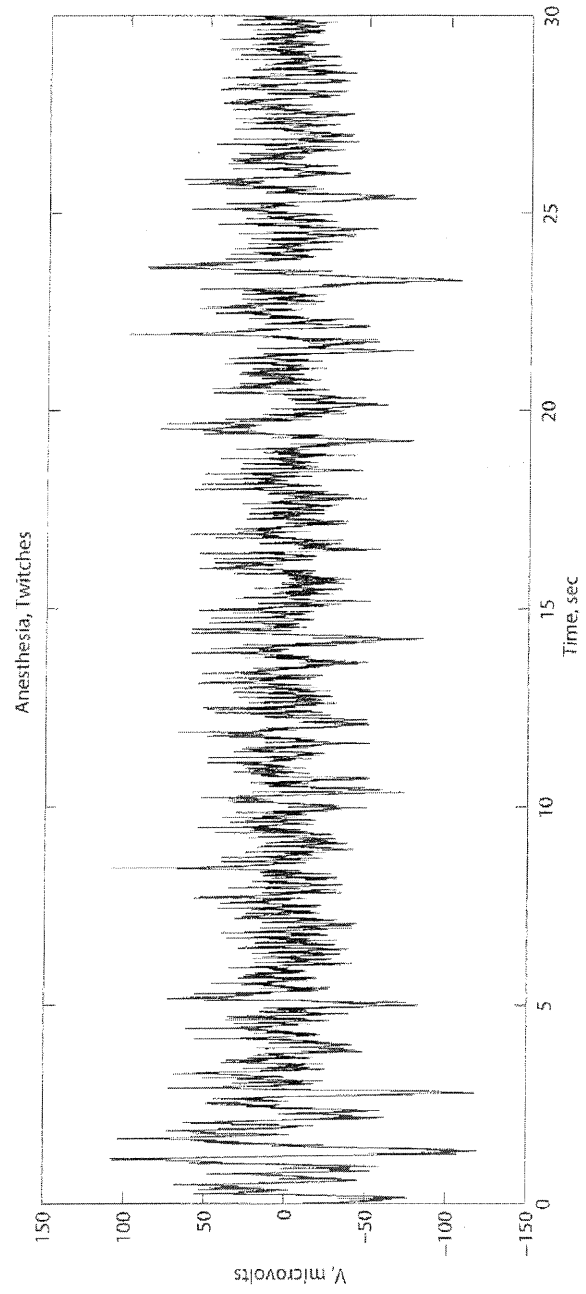


FIG. 13

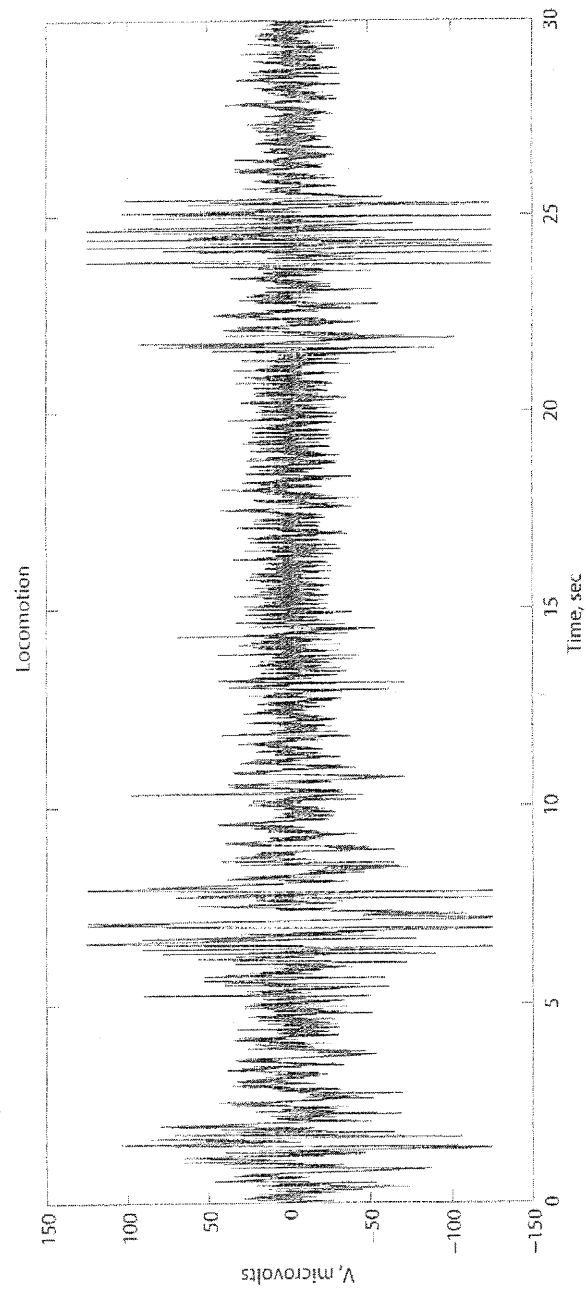


FIG. 14

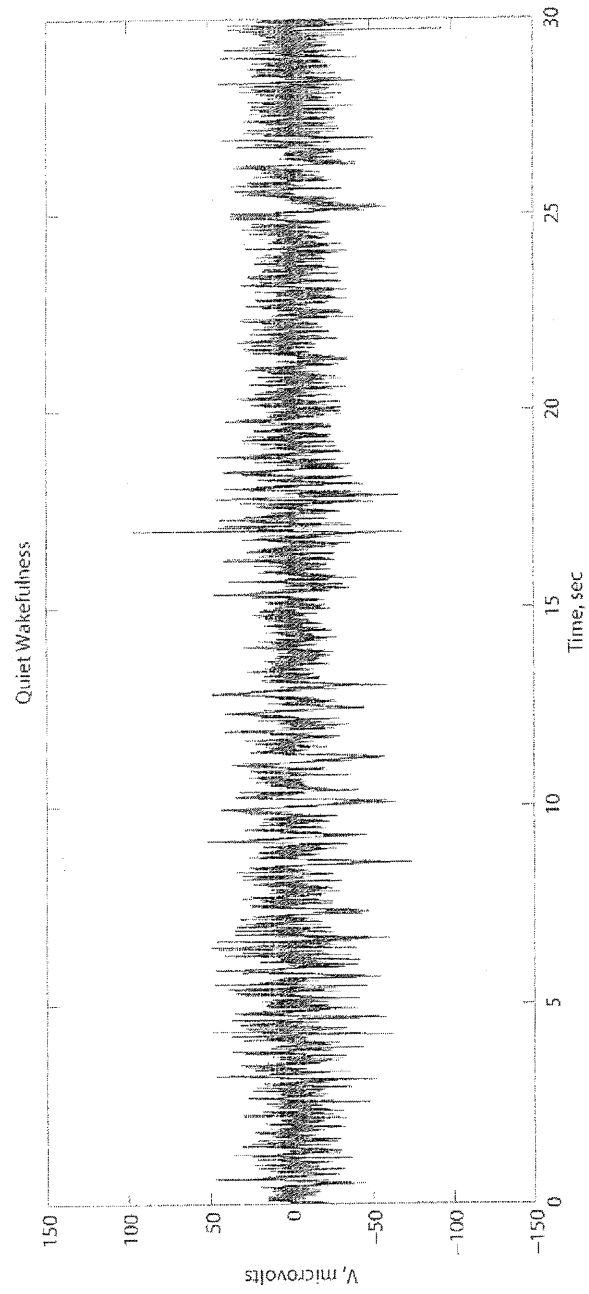


FIG. 15

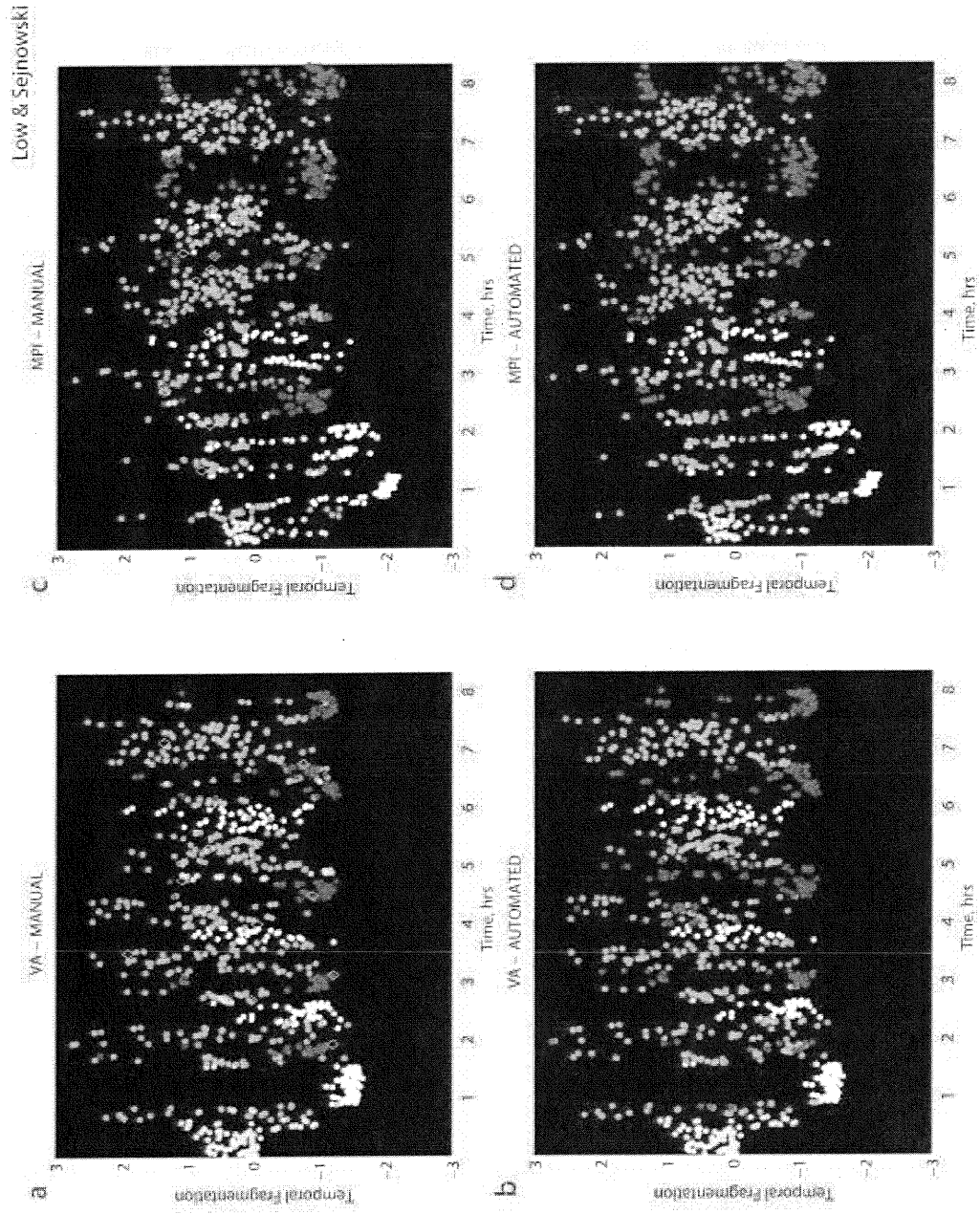
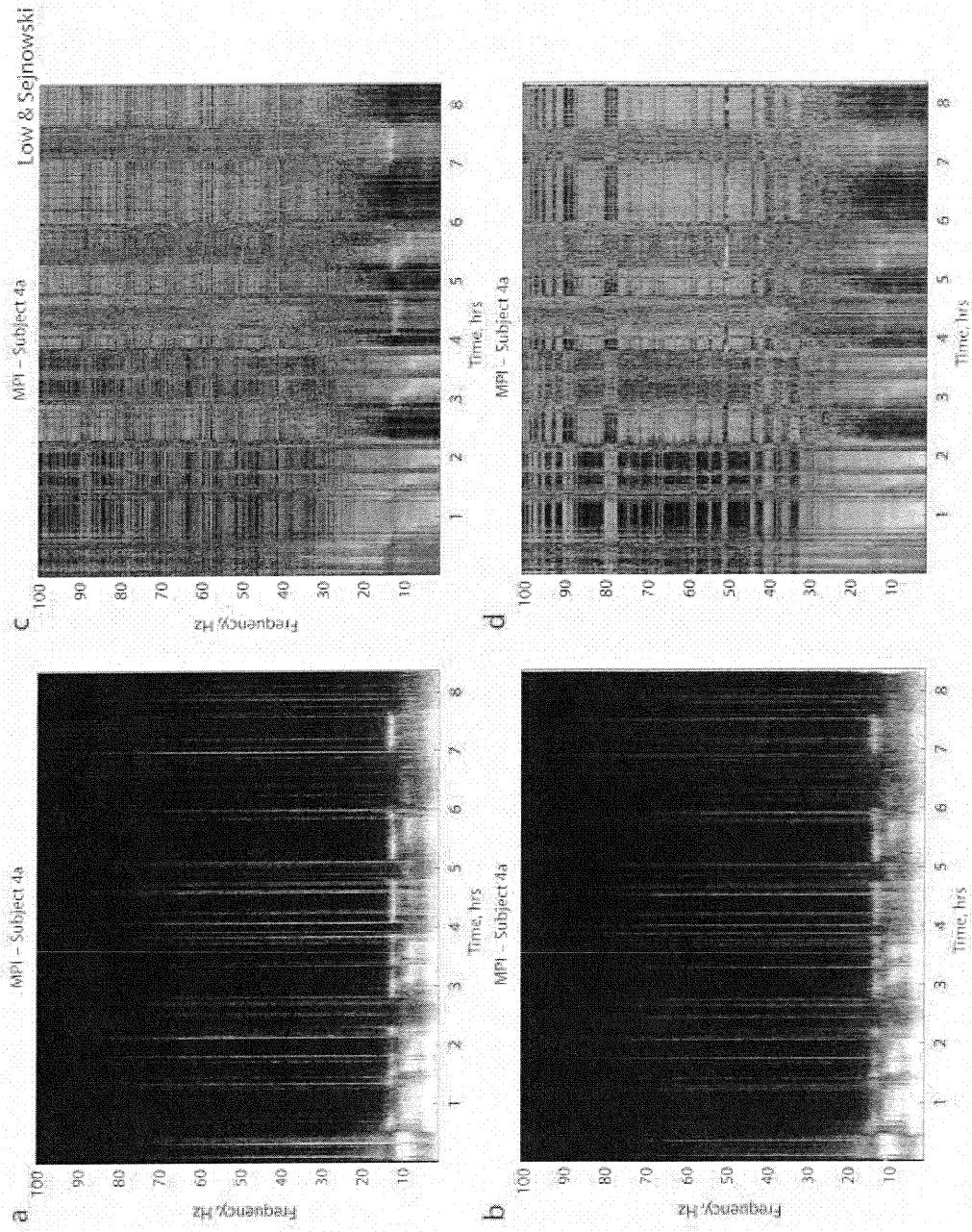


FIG. 16



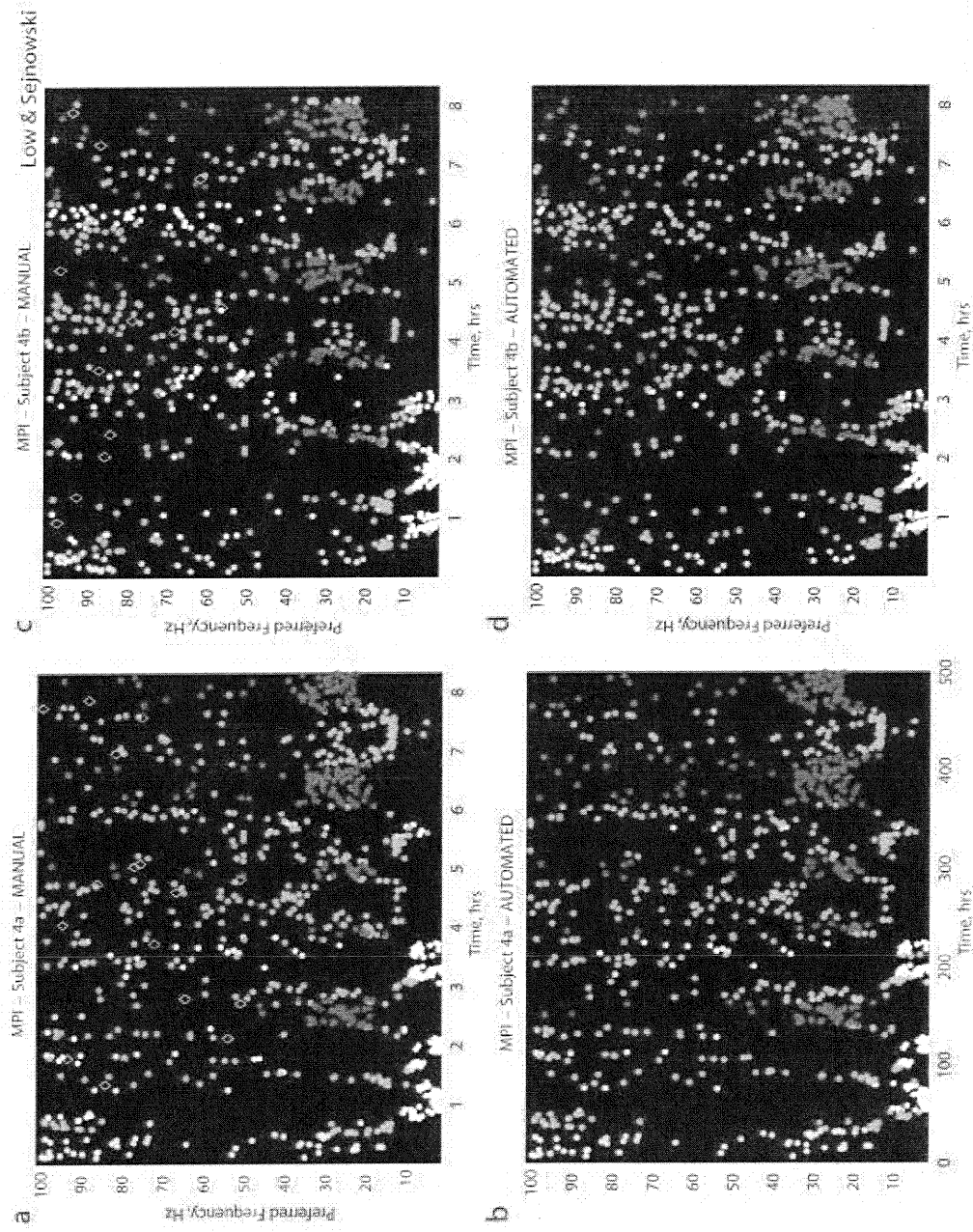


FIG. 18

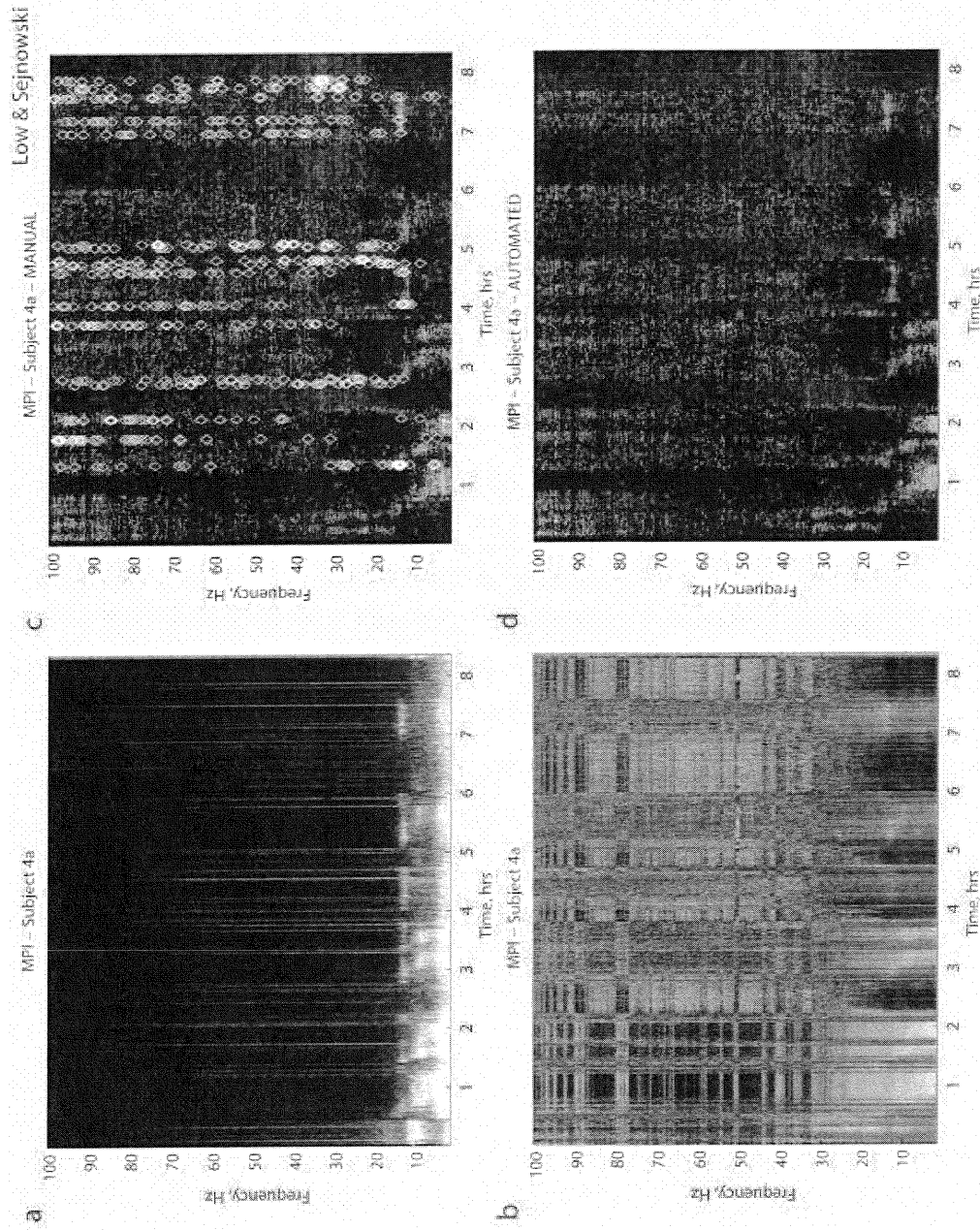


FIG. 19

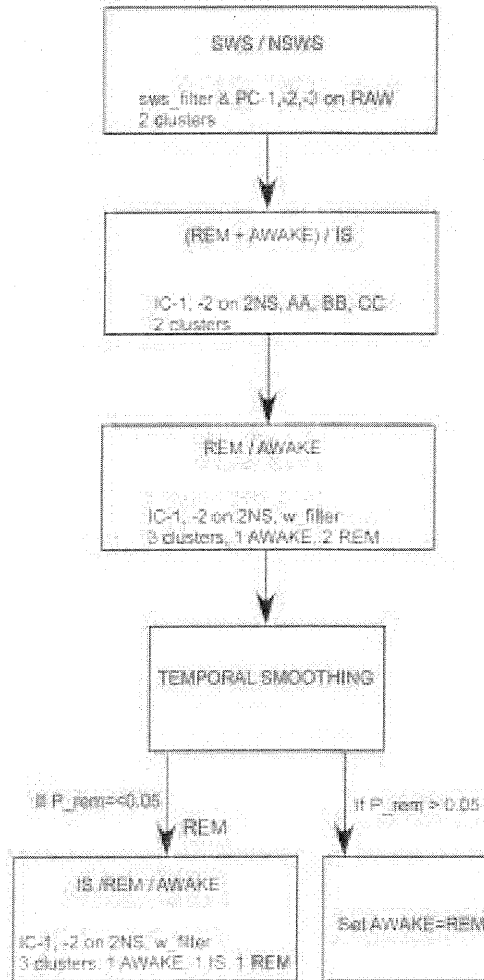


FIG. 20

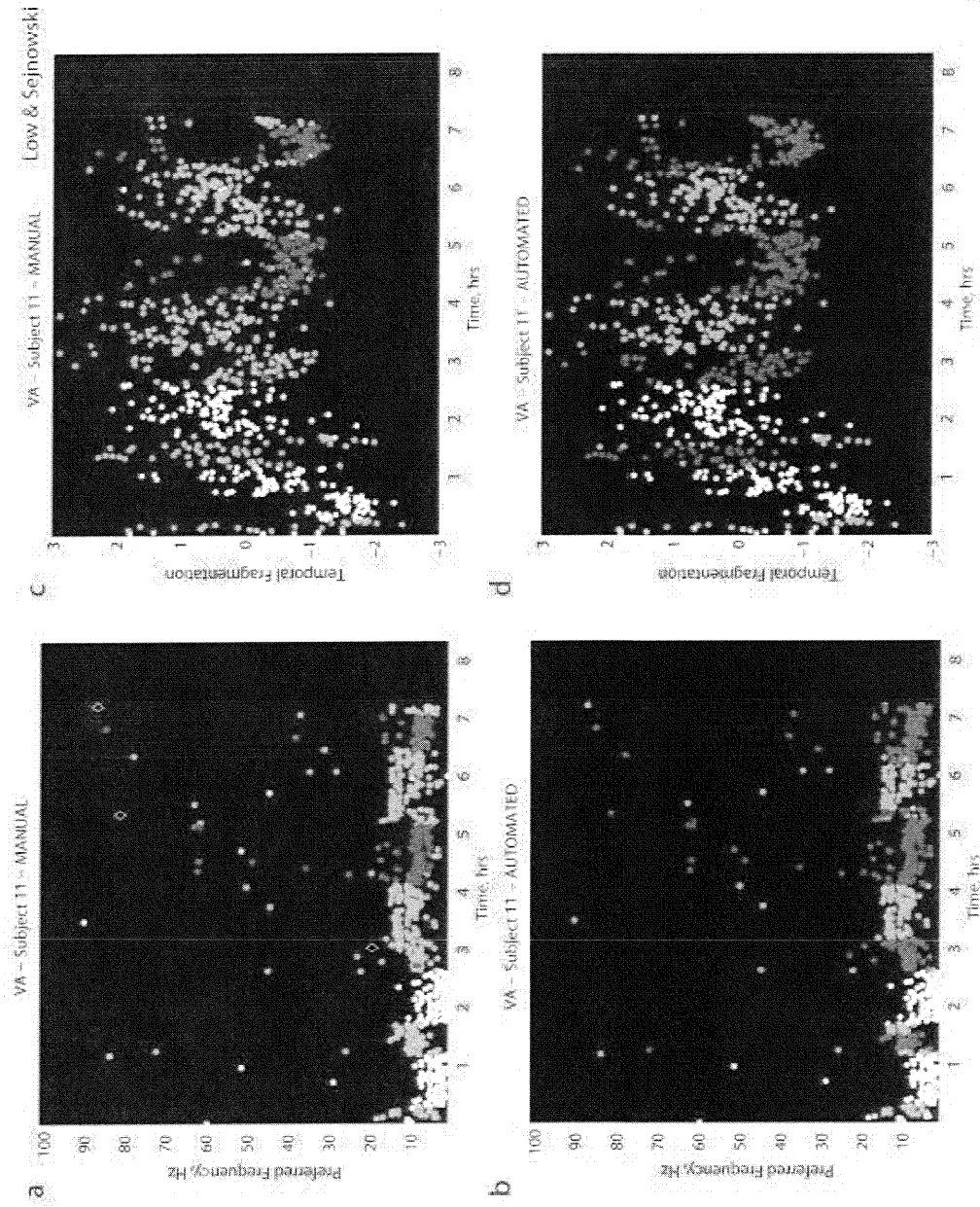


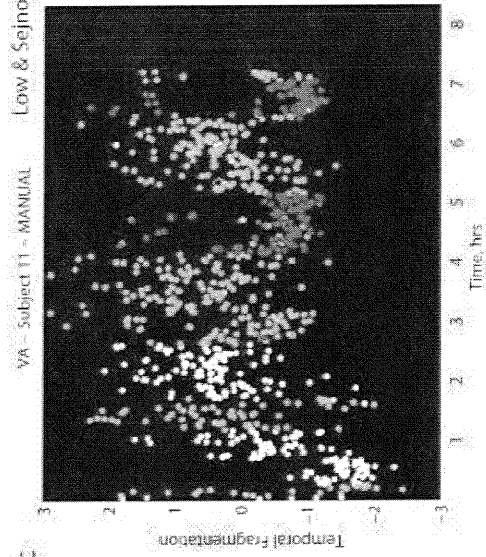
FIG. 21

VA - Subject T1 - MANUAL

VA - Subject T1 - MANUAL

a

c

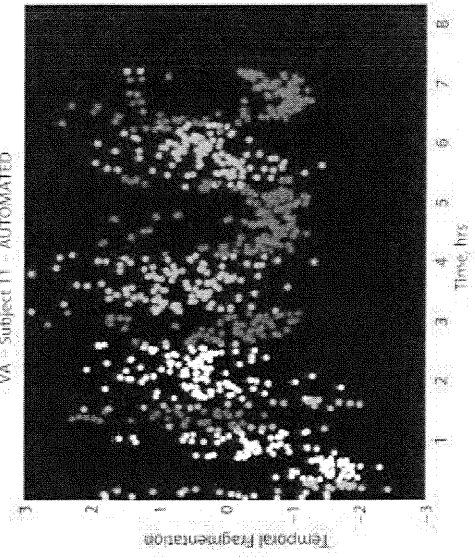


VA - Subject T1 - AUTOMATED

VA - Subject T1 - AUTOMATED

b

d



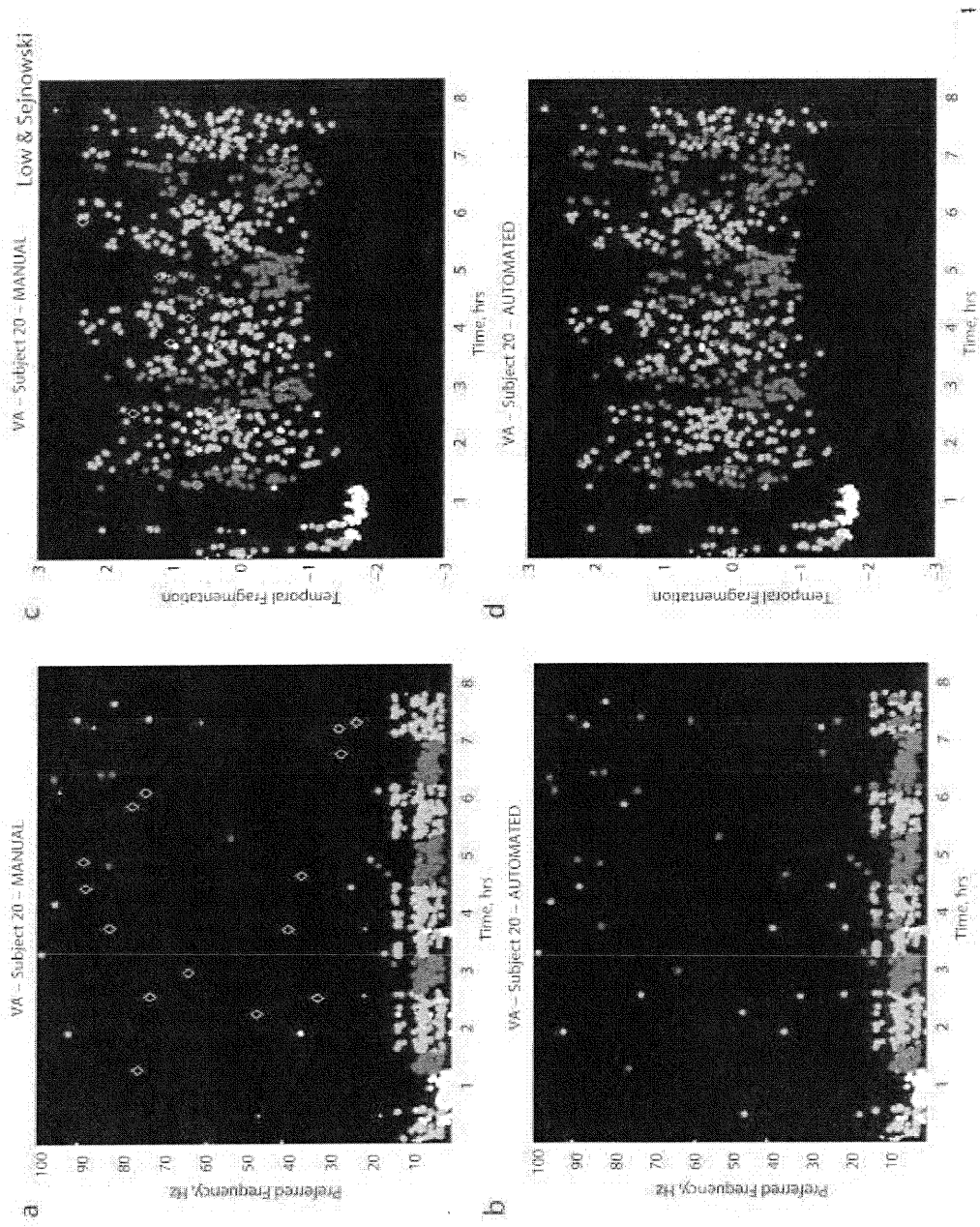


FIG. 22

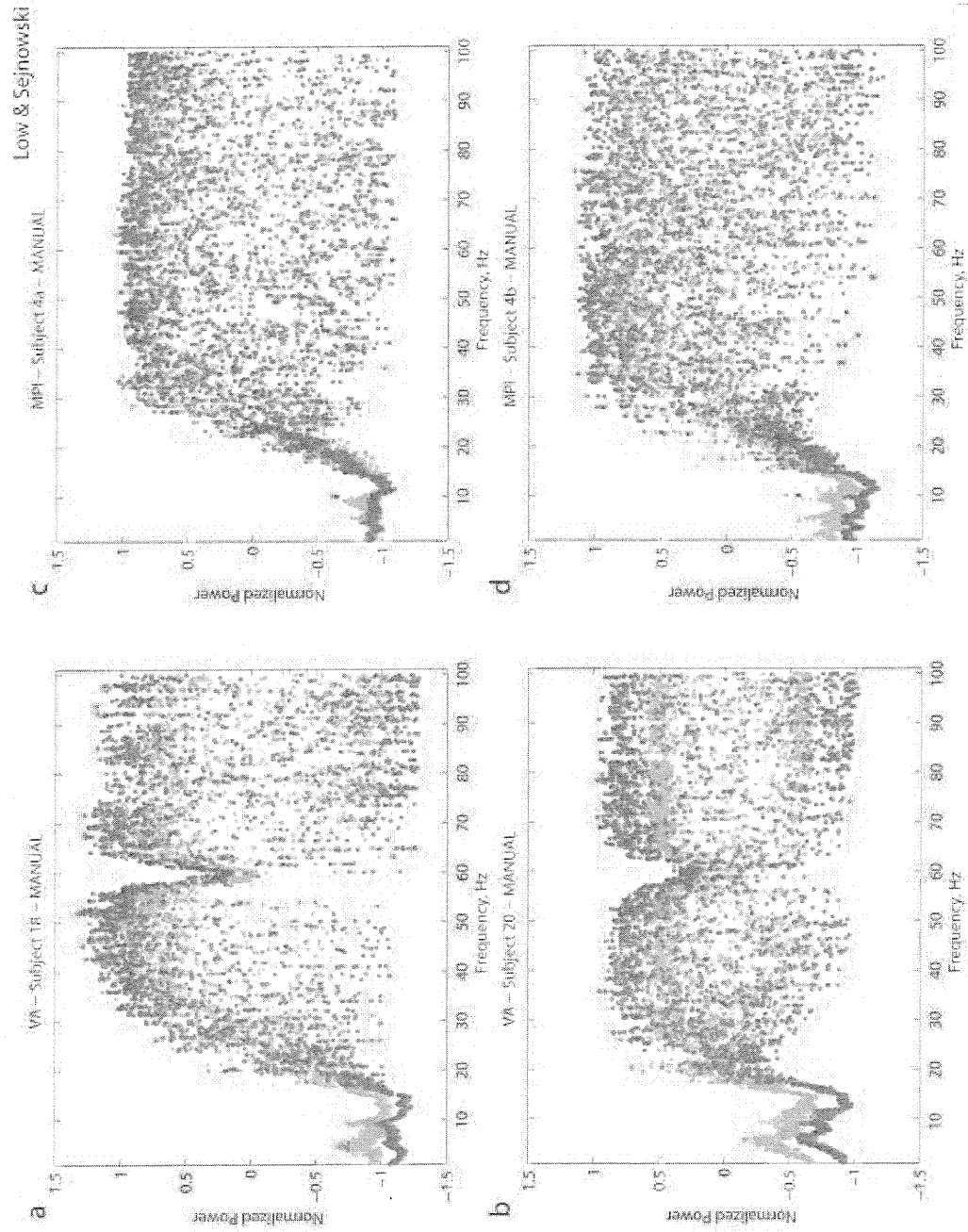


FIG. 23

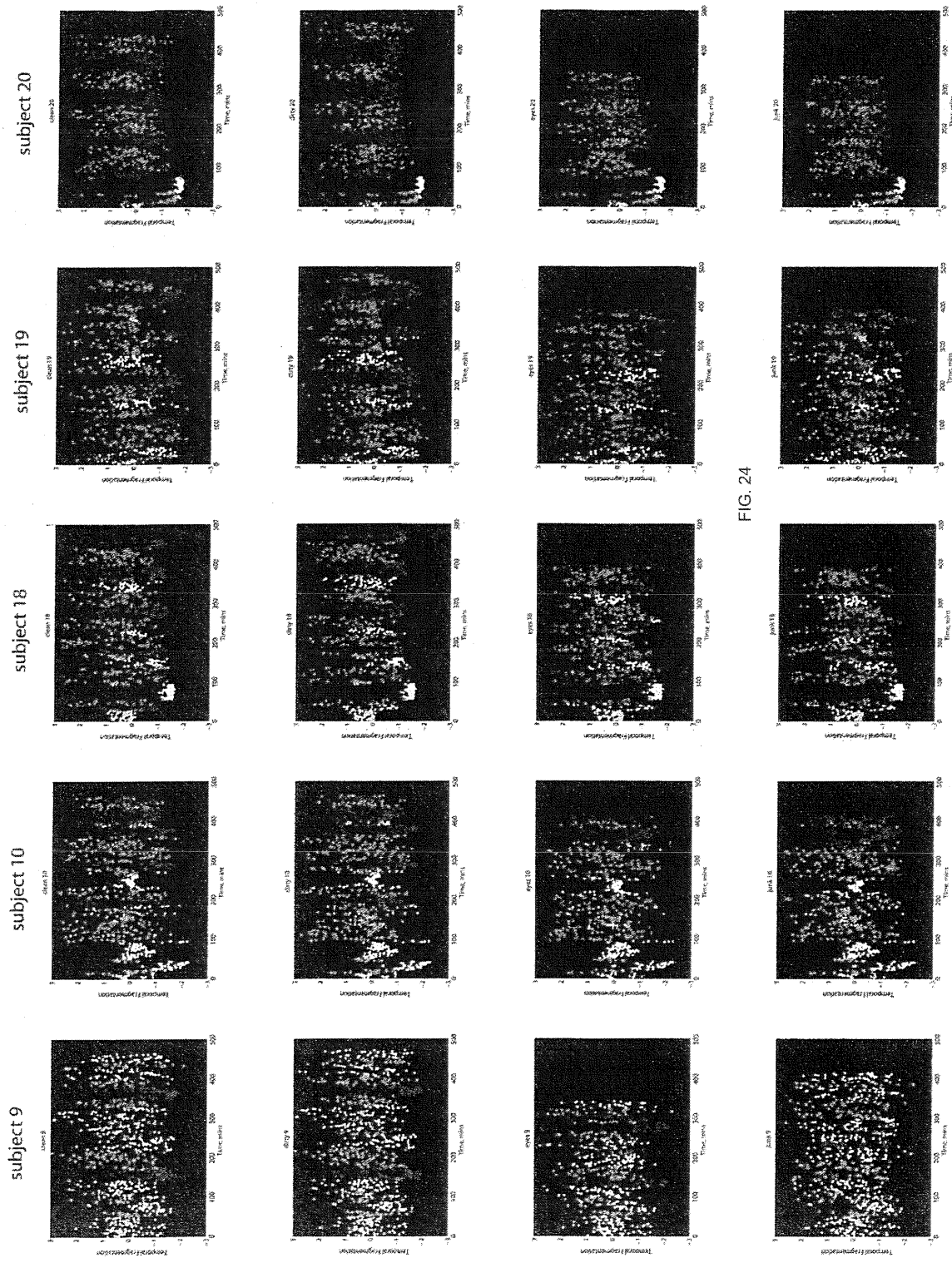
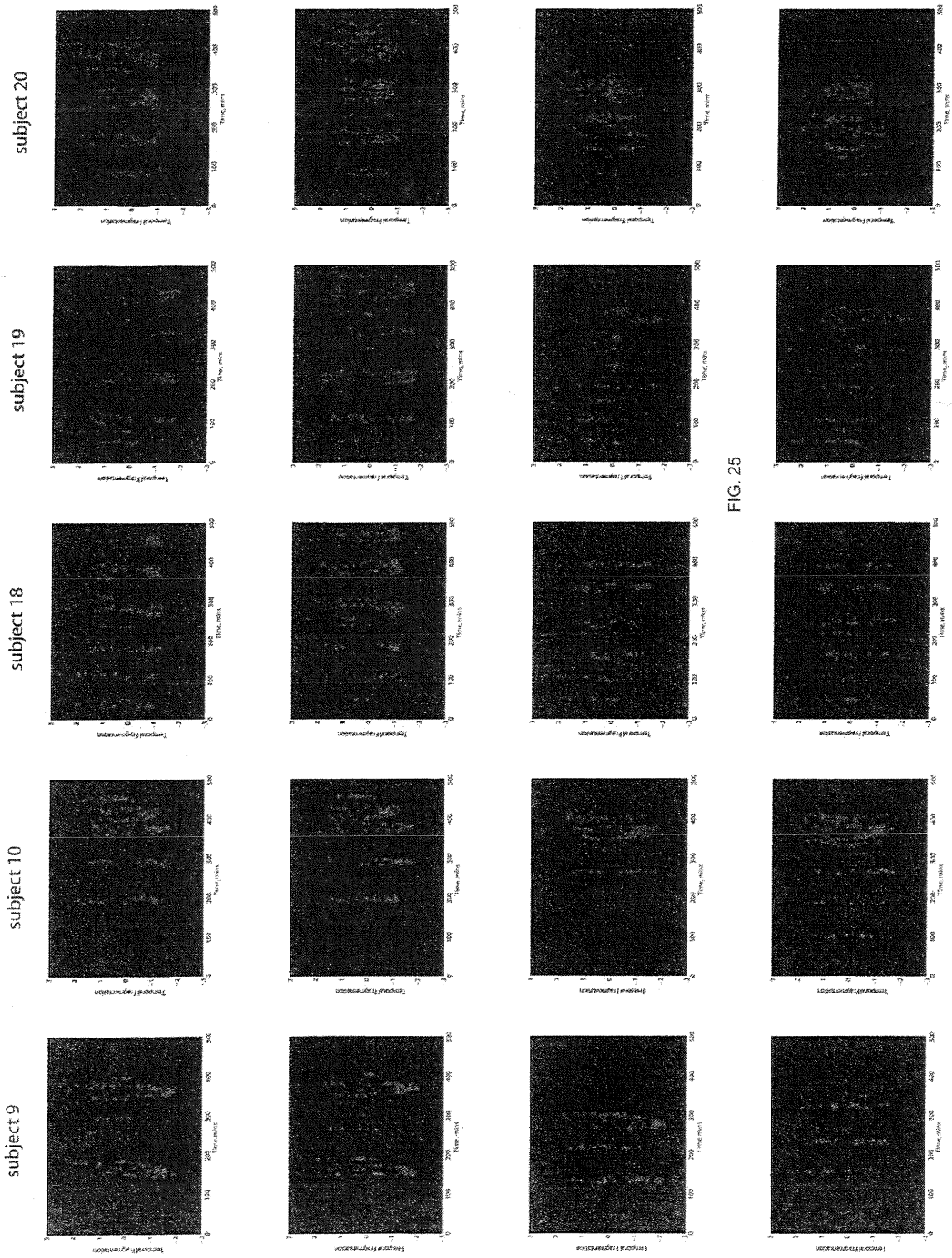


FIG. 24



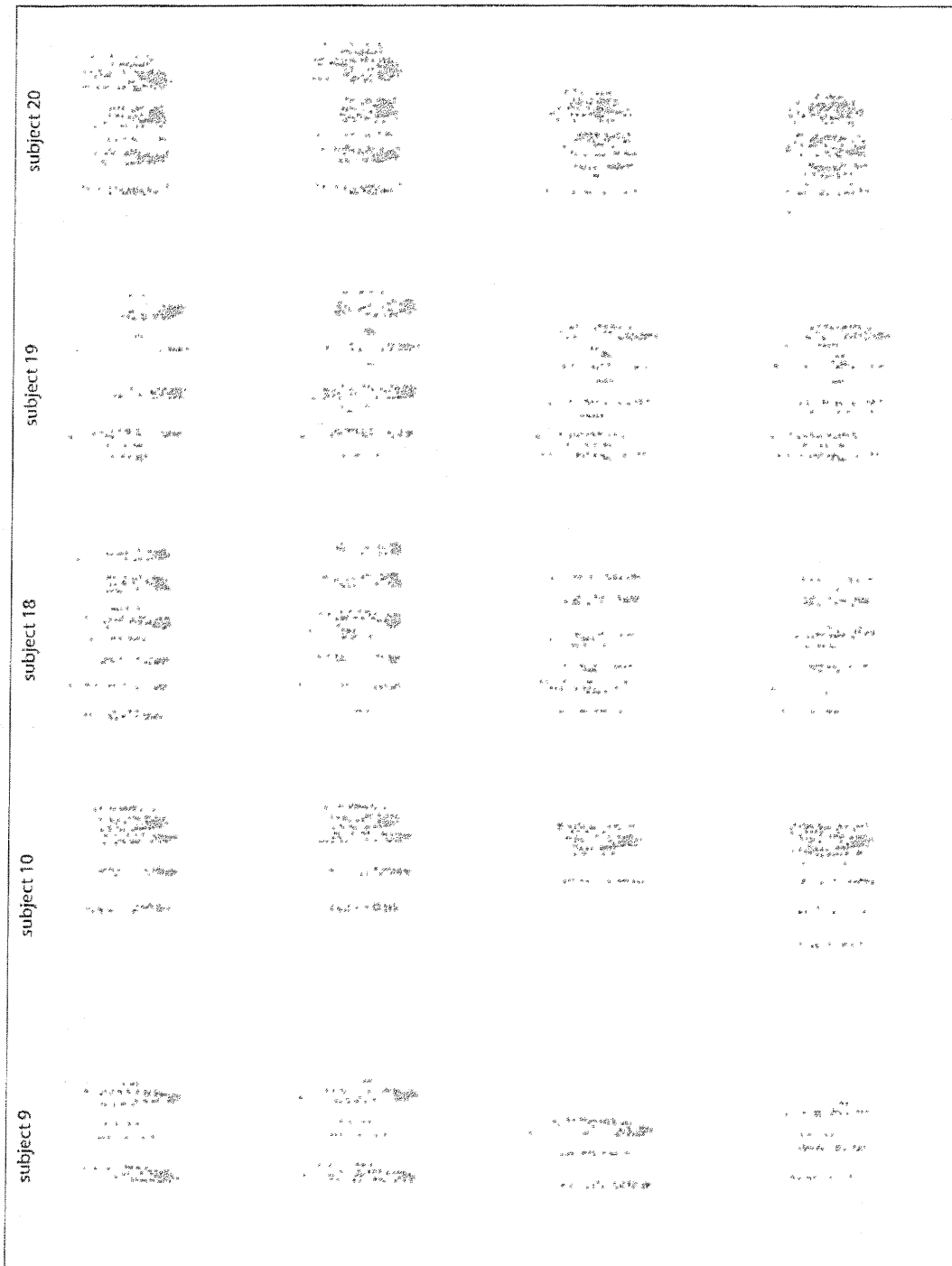


FIG. 26

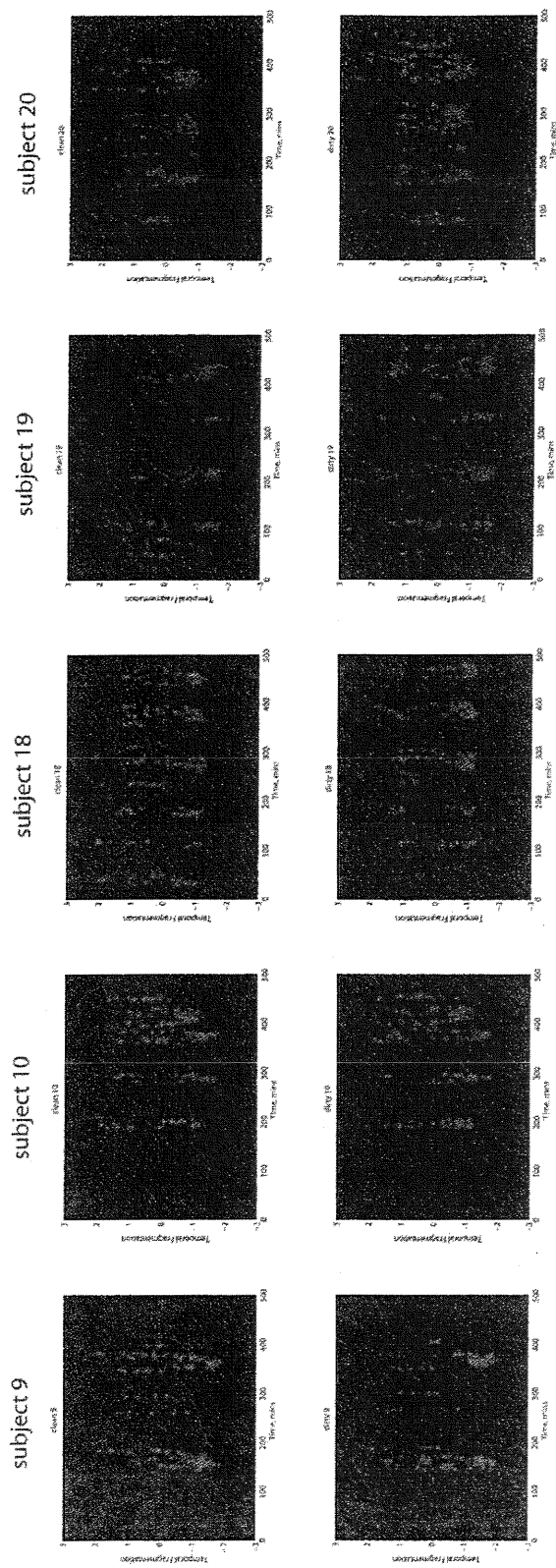


FIG. 27

TABLE S5 - TOP REM				
	%REM	Number	Mean Duration (s)	Mean Separation (s)
VA				
S_9	25.2101	25	33.6	109.0909
S_10	36.036	23	48.2609	102.6316
S_11	11.1732	21	30	87.5
S_18	15.1351	21	35.7143	163.6364
S_19	35.9551	46	33.2609	96.7742
S_20	29.0657	53	43.5849	137.0455
MPI				
S_2a	37.6471	63	44.2857	70.4348
S_2b	41.8251	68	46.7647	74.6809
S_3a	25.3086	25	44.4	169.4118
S_3b	22.7513	37	30	111.25
S_4a	24.2553	48	31.875	119.1176
S_4b	17.9724	33	29.0909	187.1429
S_5a	15.1685	21	30	312
S_5b	13.4503	20	28.5	266.6667
S_6a	17.1123	30	28	136.9565
S_6b	16.2679	32	27.1875	161.0526
S_7a	34.8958	54	31.1111	80.9091
S_7b	31.7647	51	42.3529	97.5
S_8a	25.2475	33	42.7273	140
S_8b	34.2723	49	37.3469	120
S_9a	30.1508	45	38	95.2941
S_9b	33.3333	39	42.3077	86.5385
S_10a	15.8621	21	31.4286	125
S_10b	32.2034	41	38.0488	102.8571
S_11a	29.3785	41	32.9268	104.4828
S_11b	29.3413	33	40	98.1818

FIG. 28

TABLE S6 - Eye Movements					
	Tonic	Phasic			
	no eye mvmts	0-25 %	25-50 %	50-75 %	75-100 %
VA					
S_9	31.8182	34.2105	16.6667	15.7895	20

FIG. 29

S_10	43.1818	35.0877	11.1111	0	NaN
S_11	8.046	15.2941	0	NaN	NaN
S_18	21.2766	16.092	9.375	5.5556	0
S_19	38.8889	34.2857	26.6667	33.3333	NaN
S_20	44.4444	26.5487	10.2564	14.2857	20

FIG. 29 (cont.)

TABLE S7 - Fragmentation				
	H_IS-1-REM	P_IS-1-REM	H_W-REM	P_W-REM
VA				
S_9	1	6.89E-13	1	1.43E-29
S_10	1	2.83E-02	1	6.91E-08
S_11	1	0.0035	1	2.65E-02
S_18	1	1.15E-12	1	1.88E-27
S_19	1	6.27E-08	1	2.27E-17
S_20	1	5.78E-11	1	7.53E-06
MPI				
S_2a	1	1.40E-04	1	0.0041
S_2b	0	0.2307	0	0.1047
S_3a	1	0.0054	1	1.62E-04
S_3b	1	5.41E-06	1	1.51E-07
S_4a	1	4.41E-06	1	5.94E-12
S_4b	1	9.02E-10	1	5.88E-19
S_5a	1	1.02E-04	1	4.99E-15
S_5b	1	2.11E-06	1	2.12E-20
S_6a	1	1.81E-07	1	7.93E-

FIG. 30

				28
S_6b	1	5.97E-07	1	2.14E-20
S_7a	0	0.1648	1	3.17E-02
S_7b	1	1.84E-02	0	2.07E-01
S_8a	1	1.18E-13	1	1.88E-19
S_8b	1	1.17E-06	1	4.68E-12
S_9a	1	5.40E-03	1	6.00E-07
S_9b	0	0.8904	1	4.07E-04
S_10a	1	7.27E-16	1	9.06E-49
S_10b	1	1.04E-06	1	1.47E-11
S_11a	1	2.50E-03	1	5.75E-11
S_11b	1	8.12E-06	1	4.44E-04

FIG. 30 (cont.)

Table S9 - Agreement Matrix - REM						
VA - 9			Automated			
Human	REM UP	REM DOWN				
SWS-4	0	0				
SWS-3	0	0				
IS-2	12.5	1.2048				
IS-1	10.7143	1.2048				
REM UP	48.2143	0				
REM DOWN	0	95.1807				
W	28.5714	2.4096				
M	0	0				
VA - 10			Automated			
Human	REM UP	REM DOWN				
SWS-4	0	0				
SWS-3	0	0				
IS-2	14	15.8537				
IS-1	8	1.2195				
REM UP	58	0				
REM DOWN	0	81.7073				
W	18	0				
M	2	1.2195				
VA - 11			Automated			
Human	REM UP	REM DOWN				
SWS-4	0	0.3861				
SWS-3	0	0				
IS-2	74.4681	36.2934				
IS-1	3.1915	1.1583				

Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	10	90	0	0
REM DOWN	0	11.236	0	88.764	0
Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	27.5	72.5	0	0
REM DOWN	0	5.6338	0	94.3662	0
Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	0	100	0	0
REM DOWN	0	0	0	100	0

FIG. 31

REM UP	21.2766	0												
REM DOWN	0	61.39												
W	0	0.3861												
M	1.0638	0.3861												
VA - 18	Automated								Automated					
Human	REM UP	REM DOWN							Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0							REM UP	0	7.1429	92.8571	0	0
SWS-3	0	0	REM DOWN	0	15.2866	0	84.7134	0						
IS-2	34.0909	8.0925												
IS-1	15.9091	6.3584												
REM UP	29.5455	0												
REM DOWN	0	76.8786												
W	17.0455	6.3584												
M	3.4091	2.3121												
VA - 19	Automated		Automated											
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W						
SWS-4	0	0	REM UP	0	3.125	96.875	0	0						
SWS-3	0	0	REM DOWN	0	0	0.8772	99.1228	0						
IS-2	21.6	12.3188												
IS-1	10.4	2.1739												
REM UP	49.6	0												
REM DOWN	0.8	81.8841												
W	16	0												
M	1.6	3.6232												
VA - 20	Automated		Automated											
Human	REM UP	REM	Human	SWS	IS	REM UP	REM	W						

FIG. 31 (cont.)

		DOWN					DOWN	
SWS-4	0	0	REM UP	0	5.9524	89.2857	4.7619	0
SWS-3	0	0	REM DOWN	0	0.9756	0	99.0244	0
IS-2	25	13.8462						
IS-1	6.4516	5						
REM UP	60.4839	1.5385						
REM DOWN	0	78.0769						
W	3.2258	0.3846						
M	4.8387	1.1538						
Average VA	Automated		Automated					
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0.08435	REM UP	0	8.953383	90.25297	0.79365	0
SWS-3	0	0	REM DOWN	0	5.522	0.1462	94.3318	0
IS-2	30.2765	14.60157						
IS-1	9.111083	2.852483						
REM UP	44.52005	0.256417						
REM DOWN	0.133333	79.18627						
W	13.80712	1.589783						
M	2.151933	1.449117						
MPI - 2a	Automated		Automated					
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	1.0417	95.8333	3.125	0
SWS-3	0.6135	0	REM DOWN	0	2.5157	0	97.4843	0
IS-2	27.6074	24.5536						
IS-1	11.0429	4.0179						

FIG. 31 (cont.)

REM UP	56.4417	1.3393
REM DOWN	0	69.1964
W	3.681	0.4464
M	0.6135	0.4464
MPI - 2b	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	22.695	31.1688
IS-1	6.383	5.6277
REM UP	67.3759	0
REM DOWN	0	60.6061
W	3.5461	2.1645
M	0	0.4329
MPI - 3a	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	24	23.7288
IS-1	22.6667	12.4294
REM UP	48	0
REM DOWN	0	62.7119
W	4	0.565
M	1.3333	0.565
MPI - 3b	Automated	

	Automated				
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	13.6364	86.3636	0	0
REM DOWN	0	8.4967	0	91.5033	0
	Automated				
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	12.1951	87.8049	0	0
REM DOWN	0	8.2645	0	91.7355	0
	Automated				

FIG. 31 (cont.)

Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	25.6757	18.75
IS-1	20.2703	7.8125
REM UP	48.6486	0.5208
REM DOWN	0	71.3542
W	2.7027	0.5208
M	2.7027	1.0417
MPI - 4a	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	15.5556	10.5528
IS-1	13.3333	4.0201
REM UP	62.2222	0
REM DOWN	1.1111	84.9246
W	3.3333	0
M	4.4444	0.5025
MPI - 4b	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	7.1429	6.7358
IS-1	9.5238	1.0363

Human	SWS	IS	REM UP	REM DOWN	W
REM UP	2.3256	11.6279	83.7209	2.3256	0
REM DOWN	0.6849	5.4795	0	93.8356	0

FIG. 31 (cont.)

REM UP	78.5714	0
REM DOWN	0	91.1917
W	2.381	0
M	2.381	1.0363
MPI - 5a	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	51.8519	9.0361
IS-1	1.8519	2.4096
REM UP	38.8889	0
REM DOWN	0	88.5542
W	3.7037	0
M	3.7037	0
MPI - 5b	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	17.2414	14.7239
IS-1	10.3448	2.454
REM UP	62.069	0
REM DOWN	3.4483	82.8221
W	6.8966	0
M	0	0

Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	22.2222	77.7778	0	0
REM DOWN	0	2.649	0	97.351	0
Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	21.7391	78.2609	0	0
REM DOWN	0	8.1081	0.6757	91.2162	0

FIG. 31 (cont.)

MPI - 6a	Automated			Automated				
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	31.25	68.75	0	0
SWS-3	0	0	REM DOWN	0	3.871	1.2903	94.8387	0
IS-2	8.5106	1.9737						
IS-1	2.1277	0						
REM UP	46.8085	0						
REM DOWN	4.2553	96.7105						
W	38.2979	1.3158						
M	0	0						
MPI - 6b	Automated			Automated				
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	35.2941	64.7059	0	0
SWS-3	0	0	REM DOWN	0	5.1429	0.5714	94.2857	0
IS-2	0	4.023						
IS-1	4	0.5747						
REM UP	88	0						
REM DOWN	4	94.8276						
W	4	0.5747						
M	0	0						
MPI - 7a	Automated			Automated				
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	7.4627	92.5373	0	0
SWS-3	0	0	REM DOWN	0	2.4	0	97.6	0
IS-2	25.5474	26.9565						
IS-1	24.0876	18.2609						
REM UP	45.2555	0						
REM	0	53.0435						

FIG. 31 (cont.)

DOWN								
W	2.9197	1.7391						
M	2.1898	0						
MPI - 7b	Automated							
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	100	0	0	0
SWS-3	0	0	REM DOWN	0	100	0	0	0
IS-2	90	80						
IS-1	0	10						
REM UP	0	0						
REM DOWN	0	0						
W	0	0						
M	10	10						
MPI - 8a	Automated							
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	76.4706	23.5294	0	0
SWS-3	0	0	REM DOWN	0	39.7351	0.6623	59.6026	0
IS-2	59.854	7.6923						
IS-1	16.7883	4.8077						
REM UP	8.7591	0						
REM DOWN	0.7299	86.5385						
W	12.4088	0.9615						
M	1.4599	0						
MPI - 8b	Automated							
Human	REM UP	REM	Human	SWS	IS	REM UP	REM	W

FIG. 31 (cont.)

		DOWN				DOWN	
SWS-4	0	0	REM UP	0	39.726	60.274	0
SWS-3	0	0	REM DOWN	0	7.1429	0.7143	92.1429
IS-2	26.2626	18.0723					
IS-1	13.1313	4.2169					
REM UP	44.4444	0					
REM DOWN	1.0101	77.7108					
W	7.0707	0					
M	8.0808	0					
MPI - 9a	Automated		Automated				
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN
SWS-4	0	0	REM UP	0	6.6667	93.3333	0
SWS-3	0	0	REM DOWN	0	0.7194	0	99.2806
IS-2	17.2727	18.6916					
IS-1	22.7273	13.5514					
REM UP	50.9091	0					
REM DOWN	0	64.486					
W	8.1818	2.3364					
M	0.9091	0.9346					
MPI - 9b	Automated		Automated				
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN
SWS-4	0	0	REM UP	0	11.2903	88.7097	0
SWS-3	0	0	REM DOWN	0	0.8065	0	99.1935
IS-2	17.6991	16.2162					
IS-1	24.7788	26.5766					
REM UP	48.6726	0					

FIG. 31 (cont.)

REM DOWN	0	55.4054						
W	7.0796	1.3514						
M	1.7699	0.4505						
MPI - 10a	Automated		Automated					
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	30.4348	69.5652	0	0
SWS-3	0	0	REM DOWN	0	4.918	4.0984	90.9836	0
IS-2	7.0175	11.1111						
IS-1	12.2807	9.0278						
REM UP	28.0702	0						
REM DOWN	8.7719	77.0833						
W	43.8596	2.7778						
M	0	0						
MPI - 10b	Automated		Automated					
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0	REM UP	0	22.807	77.193	0	0
SWS-3	0	0	REM DOWN	0	6.6667	0	93.3333	0
IS-2	6.8966	2.8369						
IS-1	27.5862	15.6028						
REM UP	50.5747	0						
REM DOWN	0	79.4326						
W	13.7931	1.4184						
M	1.1494	0.7092						
MPI - 11a	Automated		Automated					

FIG. 31 (cont.)

Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	0	0
IS-1	0	0
REM UP	0	0
REM DOWN	0	0
W	100	100
M	0	0
MPI - 11b	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0	0
IS-2	53.4351	26.7974
IS-1	7.6336	9.8039
REM UP	29.771	0
REM DOWN	6.1069	60.7843
W	2.2901	0.6536
M	0.7634	1.9608
average MPI	Automated	
Human	REM UP	REM DOWN
SWS-4	0	0
SWS-3	0.036088	0

Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	0	100	0	0
REM DOWN	0	0	100	0	0
Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0	20.4082	79.5918	0	0
REM DOWN	4.2373	10.1695	6.7797	78.8136	0
Automated					
Human	SWS	IS	REM UP	REM DOWN	W
REM UP	0.1368	17.93772	81.60486	0.320624	0
REM DOWN	0.289541	4.880494	0.864212	93.96576	0

FIG. 31 (cont.)

IS-2	20.84774	15.64285						
IS-1	13.75117	8.083676						
REM UP	52.63081	0.109418						
REM DOWN	1.688447	74.7556						
W	9.278641	0.933171						
M	1.767118	0.475288						
average ALL	Automated			Automated				
Human	REM UP	REM DOWN	Human	SWS	IS	REM UP	REM DOWN	W
SWS-4	0	0.016787	REM UP	0.101113	15.59398	83.86089	0.444022	0
SWS-3	0.026674	0	REM DOWN	0.214009	5.047843	0.676904	94.06125	0
IS-2	23.30741	15.37121						
IS-1	12.54071	6.719017						
REM UP	50.51496	0.147765						
REM DOWN	1.282765	75.91143						
W	10.45998	1.104461						
M	1.867504	0.72933						

FIG. 31 (cont.)

Table S10 - REM Outliers											
	Stage II			Spindles			K-complex				
	events	TOP (%)	DOWN (%)	event s	TOP (%)	DOWN (%)	event s	TOP (%)	DOWN (%)		
VA - 9	185	96.216 2	3.7838	16	93.75	6.25	4	100	0		
VA - 10	550	33.636 4	66.363 6	34	55.882 4	44.117 6	10	50	50		
VA - 18	1123	66.429 2	33.570 8	126	76.190 5	23.809 5	12	66.666 7	33.333 3		
VA - 19	1290	61.007 8	38.992 2	27	74.074 1	25.925 9	3	100	0		

FIG. 32

Table S12 - Nearest Neighbor Analysis													
	Manual						Automated						
	%0,TOP	%1,TOP	%2,TOP	%0,DOWN	%1,DOWN	%2,DOWN	%0,TOP	%1,TOP	%2,TOP	%0,DOWN	%1,DOWN	%2,DOWN	
VA - 9	12.5	62.5	25	36	24	40	52.9412	32.3529	14.7059	25	25	50	
VA - 9	12.5	62.5	25	36	24	40	52.9412	32.3529	14.7059	25	25	50	
VA -10	36.6667	50	13.3333	53.1915	40.4255	6.383	37.1429	51.4286	11.4286	58.1818	36.3636	5.4545	
VA -10	42.8571	45.7143	11.4286	56.8627	37.2549	5.8824	37.1429	51.4286	11.4286	58.1818	36.3636	5.4545	
VA -11	20	60	20	67.7165	29.1339	3.1496	63.4146	31.7073	4.878	76.3889	21.2963	2.3148	
VA -11	33.3333	50	16.6667	70	27.1429	2.8571	63.4146	31.7073	4.878	76.3889	21.2963	2.3148	
VA -18	27.7778	61.1111	11.1111	48.1013	44.3038	7.5949	48.2143	46.4286	5.3571	57.1429	36.2637	6.5934	
VA -18	38.0952	57.1429	4.7619	49.4118	43.5294	7.0588	54.386	42.1053	3.5086	58.0645	35.4839	6.4516	
VA -19	30	57.5	12.5	68.4932	28.7671	2.7397	52.9412	38.8235	8.2353	75.5556	22.2222	2.2222	
VA -19	28.9474	57.8947	13.1579	68.0556	29.1667	2.7778	52.9412	38.8235	8.2353	75.5556	22.2222	2.2222	
VA -20	55.3571	35.7143	8.9286	53.4653	33.6634	12.8713	61.6279	32.5581	5.814	64.6259	24.4898	10.8844	
VA -20	52	36	12	53.125	33.3333	13.5417	64.3678	29.8851	5.7471	64.1892	24.3243	11.4865	

FIG. 33

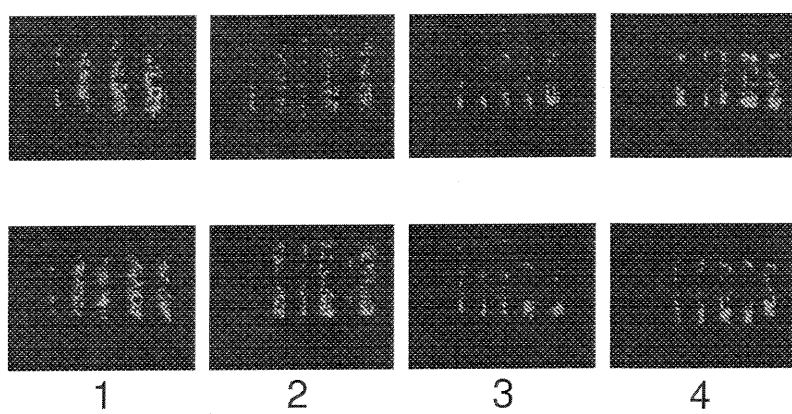


FIG. 34