



Supplementary Table S1. Participant Performance on Motor, Motor-Cognitive, and Cognitive Assessments.

	HOA		PD-Only		DM-Only		PD+DM		Main effect of PD						Main effect of DM						PD X DM						Main effect of PD						Main effect of DM						PD X DM						Main effect of PD						Main effect of DM						PD X DM						Main effect of PD						Main effect of DM						PD X DM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	Total n=170		Total n=162		Total n=56		Total n=36		df			Main effect of PD			Main effect of DM			PD X DM			Main effect of PD			Main effect of DM			PD X DM			Main effect of PD			Main effect of DM			PD X DM			Main effect of PD			Main effect of DM			PD X DM			Main effect of PD			Main effect of DM			PD X DM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	n	Mean ± STD	n	Mean ± STD	n	Mean ± STD	n	Mean ± STD	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η <sup>2</sup>	F	p-value	η 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Tower Test-Achievement Score	112	10.1 ± 2.5	111	10.05 ± 3.4	32	9.25 ± 3.1	31	11.32 ± 2.5	282	0.908	0.34	0.003	0.019	0.89	0	3.921	0.05	0.014	0.70	0.40	0.0	0.6	0.43	0.06	0.26	0.01	0.0	0.59	0.3	0.02	0.6	0.43	0.06	0.29	0.01	0.021	0.129	0.719	0	0.903	0.343	0.003	6.163	0.014	0.021	4.597	0.033	0.015	0.301	0.584	0.001	4.432	0.036	0.015		
Tower Test-Time per move (s/total moves)	112	9.4 ± 3.2	111	7.99 ± 4	32	7.66 ± 4.1	31	10.23 ± 4	282	1.05	0.31	0.004	0.102	0.75	0	14.919	<0.001	0.05	1.99	0.15	0.0	0.3	0.53	0.0	0.13	<0.0	0.0	0.2	0.00	0.15	0.0	0.2	0.59	0.0	0.13	<0.0	0.045	3.053	0.082	0.01	0.507	0.477	0.002	13.21	<0.001	0.044	0.035	0.852	0	0.146	0.703	0	11.166	0.001	0.037	
Tower Test-Mean first move (s)	112	9.67 ± 2.9	111	10.87 ± 3.5	32	9.94 ± 3.2	31	12.68 ± 2.6	282	17.863	<0.001	0.06	4.588	0.03	0.016	2.57	0.11	0.009	16.7	<0.0	0.0	5.4	0.02	0.0	0.2	0.64	0.10	0.0	0.13	<0.0	0.0	5.4	0.02	0.0	0.2	0.70	0.10	0.009	8.198	0.005	0.027	6.111	0.014	0.02	3.156	0.077	0.01	9.02	0.003	0.029	5.15	0.024	0.017	2.577	0.11	0.008
Brooks Spatial Task (% correct) <sup>†</sup>	68	60.85 ± 20.9	103	66.29 ± 19.6	28	58.86 ± 21.3	18	58.56 ± 20.8	213	2.24	0.136	0.01	1.72	0.192	0.008	0.69	0.408	0.003	0.41	0.52	0.0	0.6	0.40	0.0	0.80	0.37	0.0	0.19	0.66	0.0	0.7	0.39	0.0	0.83	0.36	0.004	0.06	0.803	0	0.70	0.402	0.003	0.78	0.379	0.003	1.034	0.31	0.004	0.997	0.319	0.004	1.173	0.28	0.005		
Corsi block (Product Score)	134	22.87 ± 15.1	156	26.99 ± 16.2	41	19.51 ± 11.8	36	31.31 ± 22.2	363	5.52	0.02	0.015	0.48	0.49	0.001	1.27	0.26	0.003	6.82	0.00	0.0	0.2	0.61	0.0	0.364	0.05	0.0	0.10	0.0	0.0	0.83	0	3.37	0.06	0.008	2.11	0.147	0.005	0.07	0.79	0	3.05	0.082	0.008	1.607	0.206	0.004	0.055	0.815	0	2.972	0.086	0.008			
SF12 (PCS) <sup>†</sup>	160	49.21 ± 9.7	136	41.52 ± 9.4	50	44.45 ± 11.6	32	38.85 ± 10.1	374	49.55	<0.001	0.115	9.95	0.002	0.023	0.68	0.41	0.002	59.5	<0.0	0.1	8.5	0.00	0.0	0.53	0.46	0.0	0.45	<0.0	0.1	7.3	0.00	0.0	0.45	0.001	33.28	<0.001	0.074	7.69	0.006	0.017	0.39	0.533	0.001	12.03	0.001	0.027	8.334	0.004	0.018	0.22	0.639	0			
SF12 (MCS) <sup>†</sup>	160	49.32 ± 8.9	136	45.8 ± 9.9	50	47.69 ± 10.4	32	42.89 ± 10.1	374	14.52	<0.001	0.037	3.23	0.073	0.008	0.28	0.601	0.001	13.1	<0.0	0.0	3.4	0.06	0.0	0.25	0.61	0.0	7.91	0.00	0.0	2.4	0.11	0.0	0.21	0.64	0.001	12.51	<0.001	0.032	1.73	0.19	0.004	0.15	0.695	0	1.692	0.194	0.004	2.324	0.128	0.006	0.443	0.506	0.001		
Life Space Questionnaire	95	6.27 ± 1.1	50	6.66 ± 1.3	33	6.09 ± 1.5	11	5.91 ± 1	185	0.05	0.83	0	0.12	0.74	0.001	0.56	0.45	0.003	0.40	0.52	0.0	1.9	0.16	0.0	1.47	0.22	0.0	0.33	0.56	0.0	1.8	0.17	0.0	0.22	0.64	0.007	0.22	0.641	0.001	1.46	0.229	0.007	1.49	0.223	0.008	0.311	0.578	0.002	1.513	0.22	0.008	1.702	0.194	0.009		
PASE	124	108.55 ± 68.9	136	105.72 ± 71.1	33	111.12 ± 78.7	34	89.31 ± 67.2	323	0.58	0.45	0.002	0.72	0.4	0.002	0.65	0.42	0.002	1.40	0.23	0.0	0.4	0.48	0.0	0.81	0.36	0.0	3.06	0.08	0.0	1.2	0.27	0.0	0.35	0.86	0.003	1.13	0.29	0.003	1.41	0.235	0.004	1.20	0.275	0.004	1.148	0.285	0.003	1.247	0.265	0.004	1.087	0.298	0.003		
CPF	165	21.27 ± 4.1	159	19.19 ± 5	56	19.39 ± 5.5	35	18.37 ± 5.4	411	10.36	<0.001	0.025	0.92	0.34	0.002	0.03	0.86	0	22.8	<0.0	0.0	5.4	0.02	0.0	1.06	0.30	0.0	0.26	<0.0	0.0	7.1	0.00	0.0	1.03	0.31	0.002	23.67	<0.001	0.052	6.78	0.01	0.015	0.84	0.361	0.002	3.897	0.049	0.008	8.05	0.005	0.017	0.41	0.522	0.001		
BDI-II	124	5.99 ± 5.7	136	12.32 ± 7.7	33	10.03 ± 10.6	33	14.21 ± 10.9	322	35.52	<0.001	0.099	1.73	0.19	0.005	1.03	0.31	0.003	50.2	<0.0	0.1	7.7	0.00	0.0	1.33	0.25	0.0	0.32	<0.0	0.0	4.6	0.03	0.0	0.24	0.8	0.003	29.52	<0.001	0.077	4.35	0.038	0.011	1.21	0.273	0.003	6.256	0.013	0.016	5.625	0.018	0.014	0.655	0.419	0.002		
ABC	126	60.67 ± 28.4	159	68.85 ± 24.1	39	58.47 ± 31.3	35	59.85 ± 26.4	355	2.60	0.11	0.007	3.20	0.07	0.009	0.67	0.41	0.002	4.06	0.04	0.0	2.3	0.12	0.0	0.71	0.4	0.0	1.95	0.16	0.0	3.3	0.06	0.0	0.41	0.66	0.002	0.74	0.391	0.002	2.59	0.108	0.007	0.75	0.388	0.002	2.842	0.093	0.008	3.151	0.077	0.008	1.123	0.29	0.003		
Falls in last year (#)	159	0.54 ± 2.02	162	11.15 ± 50.13	52	3.04 ± 12.84	36	2.75 ± 3.86	405	81.04	<0.001	0.167	1.77	0.18	0.004	7.86	0.01	0.019	7.90	0.00	0.0	0.4	0.50	0.0	1.97	0.16	0.0	0.00	0.0	0.2	0.59	0.0	0.16	0.7	0.005	8.82	0.003	0.021	0.32	0.572	0.001	2.37	0.125	0.006	2.12	0.146	0.005	0	0.992	0	0.853	0.356	0.002			
Fear of falling <sup>§</sup>	166	1.98 ± 1.31	159	3.20 ± 1.65	55	2.30 ± 1.68	35	3.01 ± 1.20	411	49.66	<0.001	0.108	0.48	0.49	0.001	0.01	0.94	0	60.5	<0.0	0.1	0.3	0.56	0.0	2.38	0.12	0.0	0.63	<0.0	0.1	1.0	0.31	0.0	0.12	0.231	0.005	47.74	<0.001	0.1	1.24	0.266	0.003	1.68	0.196	0.004	6.357	0.012	0.013	2.265	0.133	0.005	0.743	0.389	0.002		
Quality of Life <sup>§</sup>	161	5.51 ± 1.22	157	5.10 ± 1.14	55	5.26 ± 1.30	34	5.16 ± 1.33	403	2.80	0.1	0.007	0.27	0.6	0.001	1.46	0.23	0.004	12.6	<0.0	0.0	0.2	0.61	0.0	0.98	0.32	0.0	5.48	0.02	0.0	0.0	0.0	0.99	0.109	0.29	0.8	0.003	9.43	0.002	0.021	0.07	0.797	0	0.99	0.321	0.002	1.644	0.201	0.004	0.014	0.907	0	0.674	0.412	0.002	

Numbers are bolded for significant p-values adjusted for education, sex, and race. † A parametric test was used for the unadjusted p-values. Abbreviations: MWT, Minute Walk Time; TUG, Timed Up and Go; FSST, Four Square Step Test; BPST, Body Position Spatial Test; MoCA, Montreal Cognitive Assessment; CWIT, Color Word Interference Test; SF12, Short Form 12; PASE, Physical Activity Scale for the Elderly; CPF, Compostiy Physical Function; BDI-II, Beck's Depression Inventory II; ABC, Activities-specific Balance Confidence Scale. P<0.05. Significant *p* and *eta* squared values are bolded.

Supplementary Table S2. Parkinson Medication State.

	OFF-PD Meds		ON-PD Meds	
	n	Mean ± STD	n	Mean ± STD
Preferred Backward Gait Speed (m/s)	83	0.58 ± 0.27	82	0.67 ± 0.30
360 degree turn (steps)	82	12.12 ± 7.19	53	9.57 ± 3.69
360 degree turn (s)	82	6.37 ± 6.46	53	4.72 ± 2.77
TUG-Cognitive (Correct Subtractions Per Second)	79	0.03 ± 0.04	105	0.43 ± 0.26
Corsi Product Score	82	24.70 ± 14.66	110	30.11 ± 19.11

Comparison to determine if medication state influenced the main effect of Parkinson's disease. Significant findings are presented.