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TABLE S1. Number of variants included in computation of the polygenic risk scores

	MDD	BD	SCZ	ATR
Number of Overlapped SNPs	4,123,021	4,159,913	4,374,410	4,473,896
Number of Clumped SNPs	127,655	100,607	126,921	133,728

Number of SNPs in target data: 4,521,262
MDD: Major depressive disorder; BD: Bipolar disorder; SCZ: Schizophrenia;
ATR: Antidepressant treatment response.

TABLE S2. Association between polygenic risk scores and measures of improvement after ECT

	All patients						Narrow indication (unipolar depression, sensitivity analysis)					
	N	OR per SD	95% CI	P	$R^{2\,c}$	P_{ALRT}[d]	N	OR per SD	95% CI	P	$R^{2\,c}$	P_{ALRT}[d]
CGI-Improvement[a]	2,320						1,789					
PRS-MDD		0.89	0.82-0.96	0.002[e]	0.4%	0.758		0.87	0.79-0.94	0.001	0.6%	0.880
PRS-BD		1.14	1.05-1.23	0.001[e]	0.5%	0.636		1.20	1.09-1.30	7E-5	0.8%	0.558
PRS-SCZ		1.04	0.97-1.14	0.247	0.1%	0.114		1.04	0.95-1.14	0.367	0.0%	0.589
MADRS-S response[b]	1,207						815					
PRS-MDD		0.85	0.76-0.96	0.008	0.8%	-		0.85	0.73-0.98	0.026	0.8%	-
PRS-BD		1.13	1.00-1.27	0.045	0.4%	-		1.13	0.98-1.30	0.103	0.4%	-
PRS-SCZ		1.05	0.93-1.19	0.401	0.1%			1.01	0.87-1.18	0.851	0.0%	
MADRS-S remission[b]	1,207						815					
PRS-MDD		0.83	0.73-0.94	0.002	1.0%	-		0.83	0.72-0.96	0.014	0.9%	-
PRS-BD		1.15	1.02-1.29	0.023	0.6%	-		1.15	0.99-1.33	0.062	0.5%	-
PRS-SCZ		1.16	1.02-1.31	0.020	0.6%	-		1.17	1.00-1.37	0.045	0.6%	-

The table shows the results presented in Figure 1 of the manuscript.

Abbreviations: OR: odds ratio; SD: standard deviation; 95% CI: 95% confidence interval; PRS: Polygenic risk score; MDD: Major depressive disorder; BD: Bipolar disorder; SCZ: Schizophrenia; CGI-I: Clinical Global Impressions-Improvement; MADRS-S: Self-rated Montgomery-Åsberg Depression Rating Scale.

[a] An OR >1 represents more improvement with increasing PRS. Estimated from a proportional odds ordinal logistic regression models adjusted for the first five genetic ancestry principal components.

[b] An OR >1 represents higher odds of remission/response with increasing PRS. Estimated from binary logistic regression models adjusted for MADRS-S before ECT, and the first five genetic ancestry principal components.

[c] Difference in Nagelkerke R^2 between model with and without each PRS.

[d] P-value from an approximate likelihood-ratio test of the proportional odds assumption of ordinal logistic regression. A significant p-value indicates violation of the assumption.

[e] Significant after Bonferroni correction (p<0.017, only applied for analysis of the primary outcome among all patients).

TABLE S3. Associations between quintiles of PRS and CGI improvement after ECT

	All patients (N=2,320)				Narrow indication (unipolar depression) (N=1,789)			
	OR per SD[a]	95% CI	P	P$_{ALRT}$ [b]	OR per SD[a]	95% CI	P	P$_{ALRT}$ [b]
PRS-MDD quintile								
1st	Reference			0.048				0.092
2nd	1.06	0.83-1.35	0.648		1.07	0.81-1.41	0.628	
3rd	0.79	0.62-1.00	0.054		0.77	0.59-1.01	0.061	
4th	0.96	0.76-1.22	0.736		0.90	0.69-1.18	0.456	
5th	0.69	0.54-0.87	0.002		0.66	0.50-0.86	0.002	
PRS-BD quintile								
1st	Reference			0.014				3E-8
2nd	1.27	1.01-1.61	0.044		1.33	1.02-1.74	0.038	
3rd	1.17	0.92-1.49	0.210		1.35	1.02-1.79	0.038	
4th	1.49	1.17-1.91	0.001		1.64	1.24-2.17	5E-4	
5th	1.44	1.13-1.84	0.003		1.72	1.30-2.27	2E-4	
PRS-SCZ quintile								
1st	Reference			0.210				0.483
2nd	1.21	0.95-1.55	0.124		1.20	0.91-1.58	0.192	
3rd	1.21	0.96-1.52	0.104		1.08	0.83-1.41	0.570	
4th	1.27	1.00-1.61	0.052		1.20	0.92-1.57	0.181	
5th	1.11	0.87-1.42	0.404		1.12	0.85-1.48	0.426	

The table shows the results presented in Figure 2 of the manuscript.

Abbreviations: OR: odds ratio; SD: standard deviation; 95% CI: 95% confidence interval; PRS: Polygenic risk score; MDD: Major depressive disorder; BD: Bipolar disorder; SCZ: Schizophrenia.

[a] An OR >1 represents more improvement with increasing PRS. Estimated from a proportional odds ordinal logistic regression models adjusted for the first five genetic ancestry principal components.

[b] P-value from an approximate likelihood-ratio test of the proportional odds assumption of ordinal logistic regression. A significant p-value indicates violation of the assumption.

TABLE S4. Post hoc analysis of the association between a polygenic risk score for antidepressant treatment response and measures of improvement after ECT

	All patients						Narrow indication (unipolar depression, sensitivity analysis)					
	N	OR per SD	95% CI	P	R^{2c}	P_{ALRT} [d]	N	OR per SD	95% CI	P	R^{2c}	P_{ALRT} [d]
CGI-Improvement[a]	2,320	1.03	0.95-1.12	0.511	0.0%	0.676	1,789	1.07	0.97-1.17	0.182	0.1%	0.916
MADRS-S response[b]	1,207	0.99	0.87-1.12	0.860	0.0%	-	815	0.95	0.82-1.11	0.534	0.1%	-
MADRS-S remission[b]	1,207	0.96	0.85-1.09	0.542	0.0%	-	815	0.95	0.82-1.11	0.516	0.1%	-

Antidepressant response: Percentage improvement on antidepressants.
Abbreviations: OR: odds ratio; SD: standard deviation; 95% CI: 95% confidence interval; PRS: Polygenic risk score; CGI-I: Clinical Global Impressions-Improvement; MADRS-S: Self-rated Montgomery-Åsberg Depression Rating Scale.
[a] An OR >1 represents more improvement with increasing PRS. Estimated from a proportional odds ordinal logistic regression models adjusted for the first five genetic ancestry principal components.
[b] An OR >1 represents higher odds of remission/response with increasing PRS. Estimated from binary logistic regression models adjusted for MADRS-S before ECT, and the first five genetic ancestry principal components.
[c] Difference in Nagelkerke R^2 between model with and without each PRS.
[d] P-value from an approximate likelihood-ratio test of the proportional odds assumption of ordinal logistic regression. A significant p-value indicates violation of the assumption.

TABLE S5. Association between polygenic risk scores and measures of improvement after ECT according to electrode placement

	Unilateral (N=2012)					Bilateral (N=306)				
	OR per SD[a]	95% CI	P	R^{2} [b]	P_{ALRT}[c]	OR per SD[a]	95% CI	P	R^{2} [b]	P_{ALRT}[c]
PRS-MDD	0.90	0.83-0.98	0.014	0.3%	0.624	0.79	0.65-0.97	0.024	1.6%	0.116
PRS-BD	1.15	1.05-1.25	0.002	0.5%	0.474	1.10	0.92-1.31	0.296	0.3%	0.178
PRS-SCZ	1.03	0.95-1.13	0.477	0.0%	0.613	1.15	0.93-1.43	0.186	0.6%	0.322

Data on electrode placement was missing for two participants.
Abbreviations: OR: odds ratio; SD: standard deviation; 95% CI: 95% confidence interval; PRS: Polygenic risk score; MDD: Major depressive disorder; BD: Bipolar disorder; SCZ: Schizophrenia; CGI-I: Clinical Global Impressions-Improvement.
[a] An OR >1 represents more improvement with increasing PRS. Estimated from ordinal logistic regression models adjusted for the first five genetic ancestry principal components.
[b] Difference in Nagelkerke R^{2} between model with and without each PRS.
[c] P-value from an approximate likelihood-ratio test of the proportional odds assumption of ordinal logistic regression. A significant p-value indicates violation of the assumption.

TABLE S6. Association between polygenic risk scores and measures of improvement after ECT according to presence of psychotic features

|	Non-psychotic (N=1,972)					Psychotic (N=348)				
	OR per SD[a]	95% CI	P	R^{2} [b]	P_{ALRT}[c]	OR per SD[a]	95% CI	P	R^{2} [b]	P_{ALRT}[c]
PRS-MDD	0.90	0.83-0.97	0.010	0.4%	0.857	0.90	0.73-1.12	0.413	0.3%	0.693
PRS-BD	1.11	1.02-1.20	0.019	0.3%	0.799	1.13	0.91-1.40	0.347	0.4%	0.584
PRS-SCZ	1.02	0.94-1.12	0.582	0.0%	0.172	1.06	0.84-1.33	0.698	0.1%	0.678

Abbreviations: OR: odds ratio; SD: standard deviation; 95% CI: 95% confidence interval; PRS: Polygenic risk score; MDD: Major depressive disorder; BD: Bipolar disorder; SCZ: Schizophrenia; CGI-I: Clinical Global Impressions-Improvement.
[a] An OR >1 represents more improvement with increasing PRS. Estimated from ordinal logistic regression models adjusted for the first five genetic ancestry principal components.
[b] Difference in Nagelkerke R^2 between model with and without each PRS.
[c] P-value from an approximate likelihood-ratio test of the proportional odds assumption of ordinal logistic regression. A significant p-value indicates violation of the assumption.
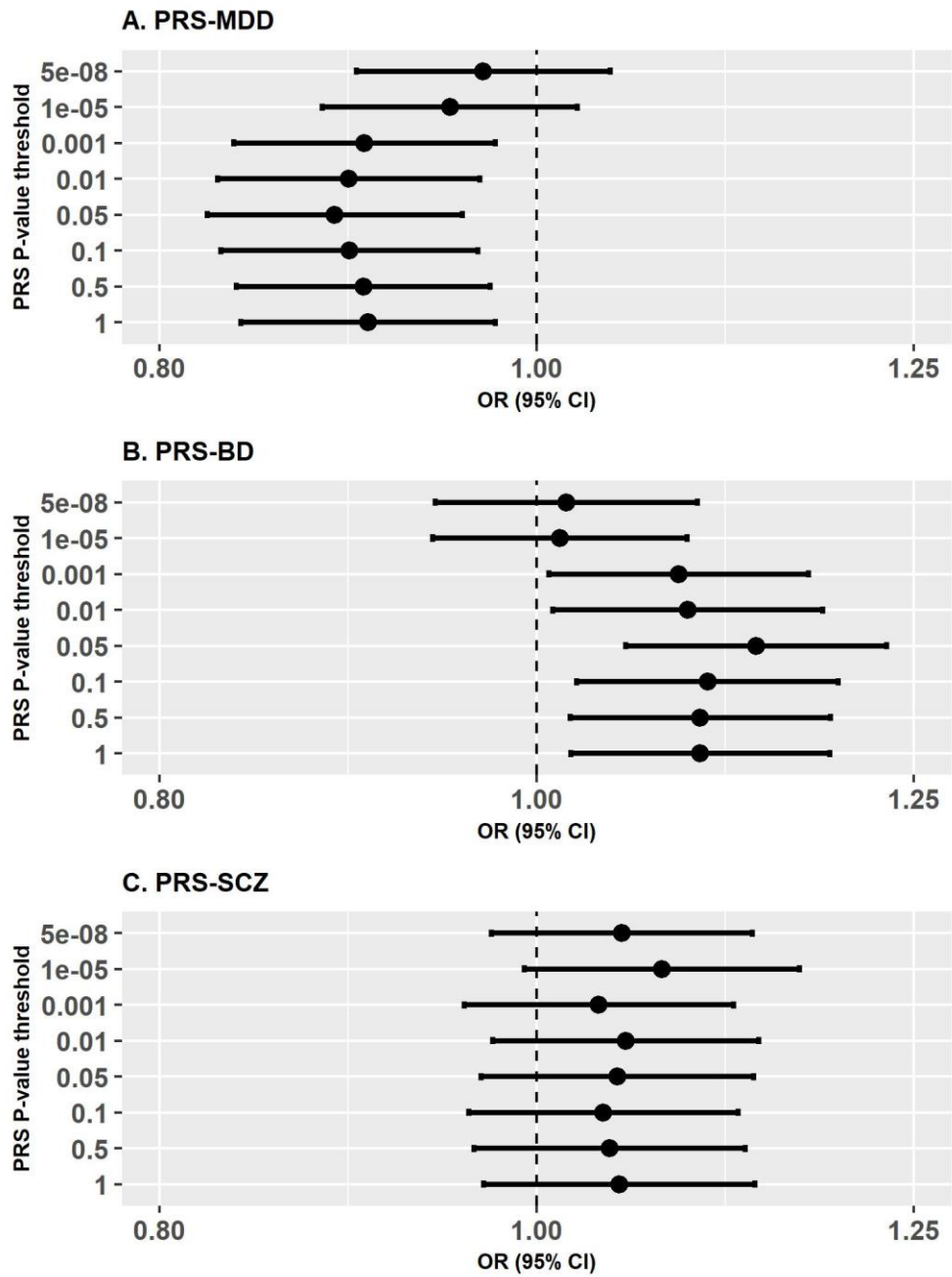
FIGURE S1. Distribution of CGI improvement scale ratings
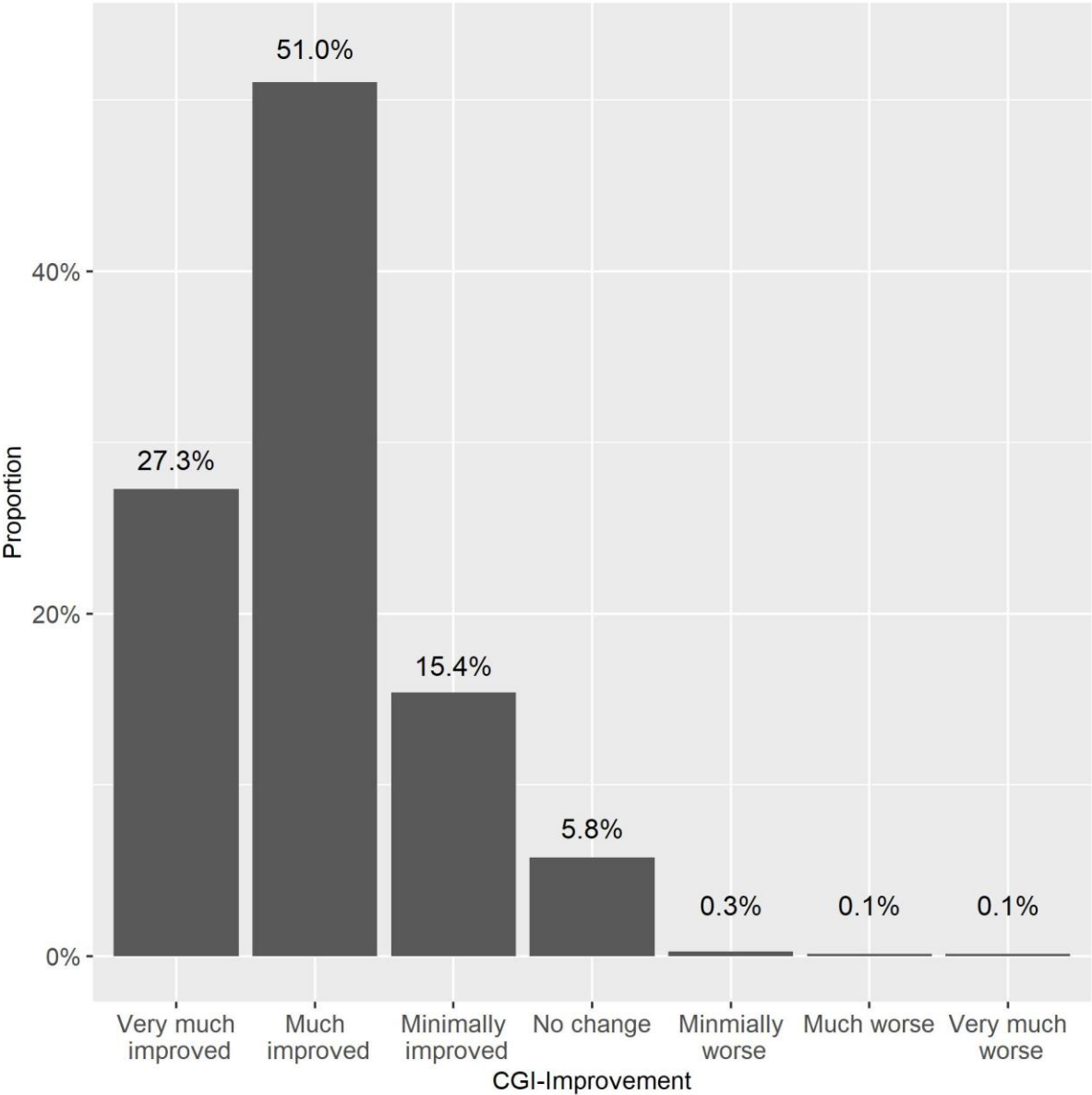
The figure shows the distribution of CGI improvement scale ratings among all patients in the study (N=2,320).

FIGURE 2. Association between PRS at different p-value thresholds and CGI-Improvement

The figure shows the odds of a more favorable outcome according to CGI-I (Clinical Global Impressions improvement scale) for PRS (Polygenic risk scores) calculated from different p-value thresholds (N=2,320). The bars represent 95% confidence intervals. Estimated from ordinal logistic regression models adjusted for the first five genetic ancestry principal components. PRS are coded as risk increasing. The x-axis is logarithmic. **Panel A:** PRS-MDD (Major depressive disorder). **Panel B:** PRS-BD (Bipolar disorder). **Panel C:** PRS-SCZ (Schizophrenia)