Supplementary Materials

Table S1. Table of patient demographics by outcome group

	Age	Sex	Days ON	Implant Laterality	Mesiotemporal / Neocortical Lead Placement
Super responders (>90% seizure reduction)	24	F	559	B	Mesiotemporal
	24	F	1423	L	Neocortical
	30	F	231	B	Mesiotemporal
	30	F	1521	R	Neocortical
	37	F	890	B	Mesiotemporal
	40	F	1261	L	Mesiotemporal / Neocortical
	40	F	196	B	Mesiotemporal
	21	M	729	B	Mesiotemporal
	26	M	262	L	Neocortical
	40	M	250	B	Mesiotemporal
Intermediate responders (≥ 50% seizure reduction and ≤ 90% seizure reduction)	26	F	199	B	Mesiotemporal
	42	F	2155	R	Neocortical
	18	F	1988	L	Neocortical
	30	F	700	R	Neocortical
	29	F	2203	L	Neocortical
	45	F	819	B	Mesiotemporal
	61	F	1185	L	Mesiotemporal / Neocortical
	23	F	562	B	Mesiotemporal
	27	F	1074	R	Mesiotemporal / Neocortical
	29	M	854	L	Mesiotemporal / Neocortical
	50	M	230	B	Mesiotemporal
	36	M	218	L	Neocortical
	33	M	1172	B	Mesiotemporal
	50	M	371	L	Neocortical
	49	M	1511	B	Mesiotemporal
	21	M	763	B	Neocortical
	59	M	1425	L	Neocortical
	25	M	1254	R	Neocortical
	37	M	1232	B	Mesiotemporal
Poor responders (<50% seizure reduction)	23	F	753	R	Neocortical
	42	F	1146	B	Mesiotemporal
	39	F	1350	B	Mesiotemporal
	42	F	521	L	Mesiotemporal / Neocortical
	66	F	203	B	Neocortical
	22	F	180	L	Neocortical
	33	M	498	R	Neocortical
	38	M	1366	B	Mesiotemporal
	50	M	846	R	Neocortical
	34	M	443	L	Neocortical
	17	M	717	L	Mesiotemporal / Neocortical

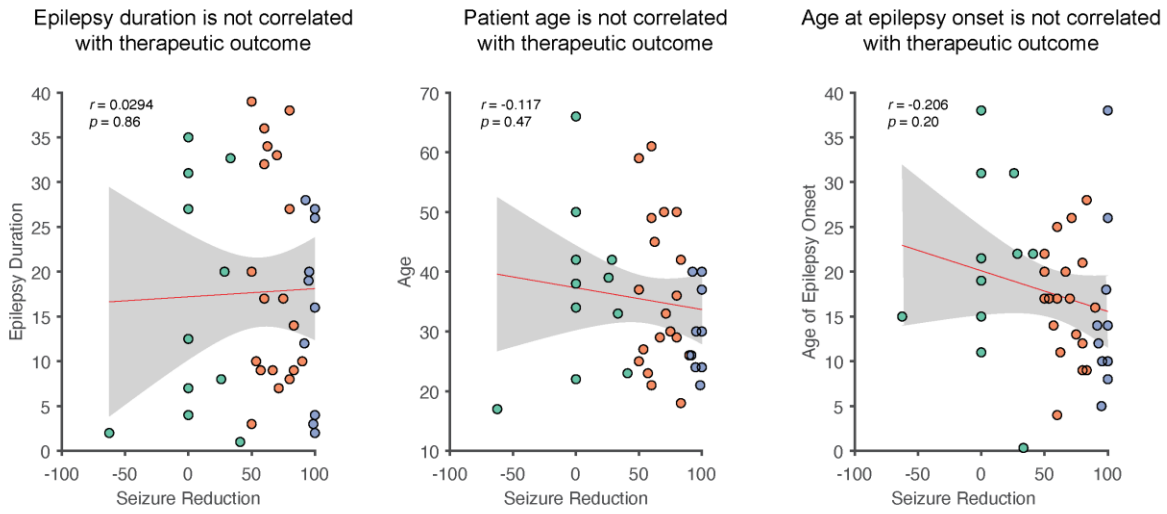

Figure S1. Epilepsy duration, patient age, and age of epilepsy onset do not correlate with outcome. There is no significant correlation between patient outcomes and epilepsy duration, patient age at the time of device implant, or age of epilepsy onset. Blue circles are super responders, orange circles are intermediate responders, green circles are poor responders.

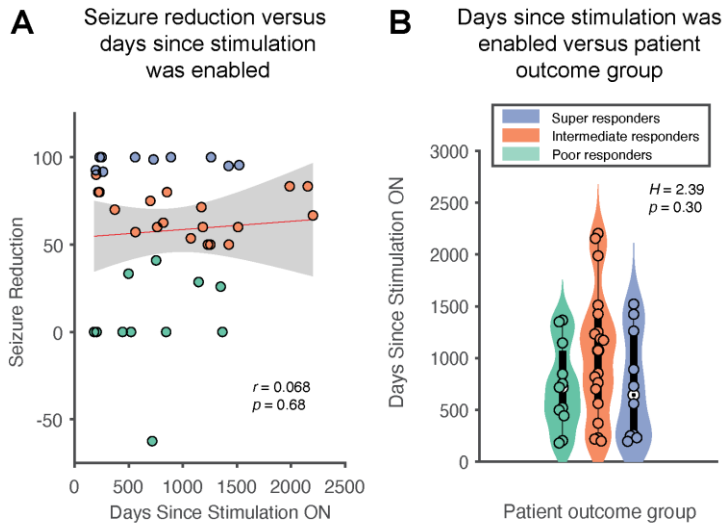

Figure S2. Implant time does not correlate with patient outcome group. There is no significant correlation between patient outcomes and the time since stimulation was enabled over a continuous measurement (A) or across patient groups (B).

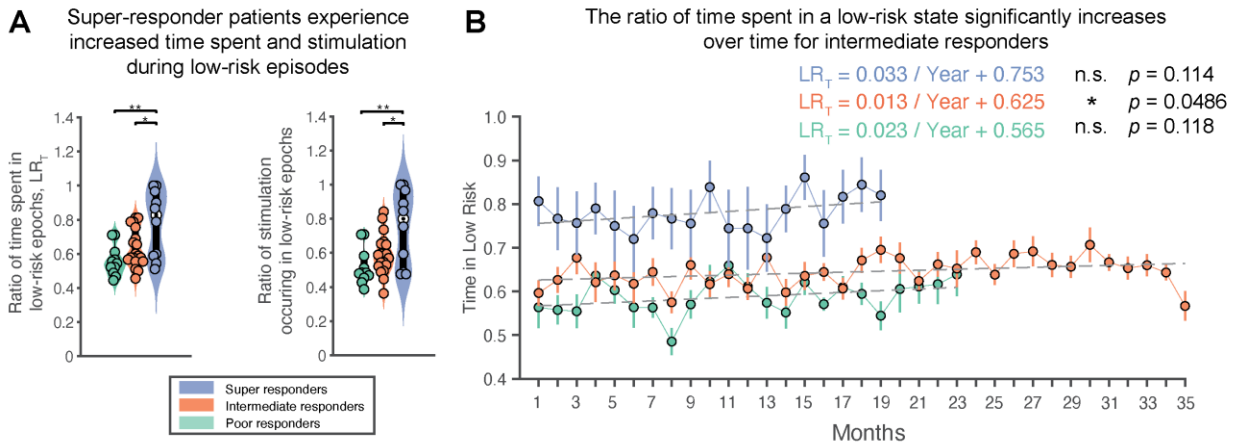

Figure S3. Separation of the ratio of time spent and stimulation in low-risk periods across three patient subgroups. A. Super responders demonstrate a significant increase in the time spent in low-risk states that intermediate responders and poor responders (two-sample *t*-test, $p = 0.024$ and $p = 0.0017$, respectively. One-way ANOVA: $F = 7.29$; $p = 0.0021$). Similarly, super responders demonstrate a significant increase in the time spent in low-risk states that intermediate responders and poor responders (two-sample *t*-test; $p = 0.025$ and $p = 0.0027$, respectively. One-way ANOVA: $F = 6.76$; $p = 0.0032$). There were not significant differences between intermediate and poor responders. **B.** There is a visible separation between super responder, intermediate responder, and poor responder groups over time. However, only the intermediate responder group shows a statistically significant increase over the course of therapy (Pearson's correlation; $p = 0.0486$).

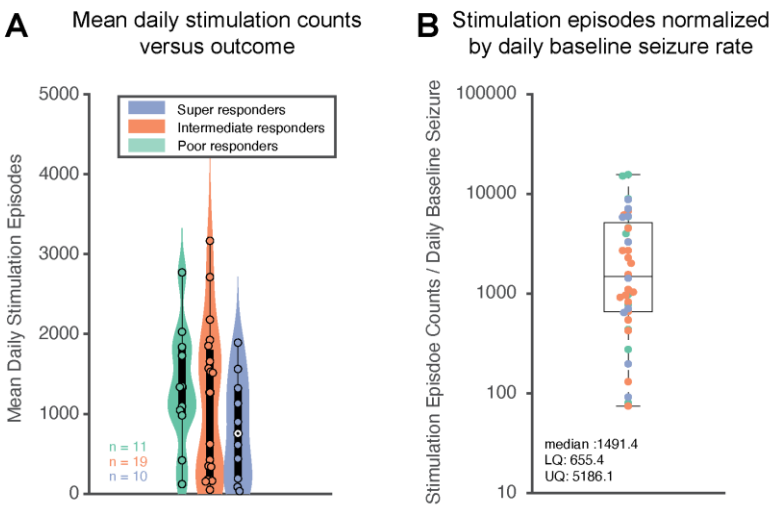

Figure S4. Daily stimulation episodes far exceed daily seizures. (**A**) There is no significant difference between the number of stimulation episodes across super responders, intermediate responders, and poor responders. Median daily stimulation episode counts for the duration of therapy is 1112.9 episodes/day (LQ: 341.330, UQ: 1692.987). (**B**) Average daily stimulation normalized by baseline daily seizure rate demonstrates that patients have far greater stimulation episodes than seizures, indicating that the vast majority of stimulation is not given solely in response to seizures (Median 1491.4; LQ: 655.4; UQ: 5186.1).

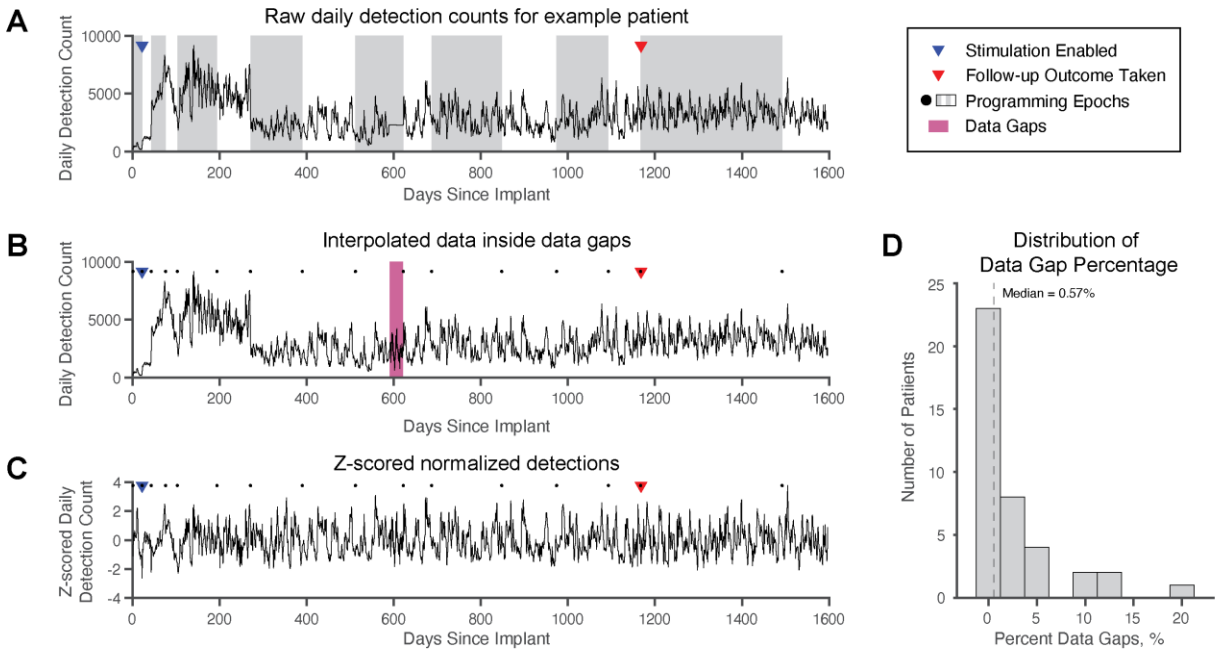

Figure S5. Addressing data gaps with interpolation and variability in detection counts with z-scoring. (**A**) Raw detection counts from patient histograms can be visualized over the course of therapy and correspond to interictal epileptiform discharges. Sudden changes in detection counts can occur due to changes in detection settings within each programming epochs (shaded gray area). (**B**) Patient data streams can have gaps, marked in pink, when the patient did not regularly upload data and older histogram data was overwritten to accommodate new data. Days with less than <12 hours of histogram counts were also considered to be a missing. Following methods developed by Baud et al., 2018, we interpolated data in the gap periods using known data the same length of the gap period on each side of the gap. We found a linear fit between the two ends of the gap period and applied Gaussian noise using the standard deviation of flanking regions. (**C**) When raw data is z-scored to ensure regularity in amplitudes, z-scoring occurs within programming epochs (annotated by black dots). (**D**) Most patients experience few data gaps, with a median gap percentage of 0.57% (minimum: 0%, maximum 22.5%).