Table S1. Summary of known participant and modality availability. This table separates repository availability from inclusion in the technical validation analyses.

Participant(s)	Availability status	Implication for reuse
sub-001–sub-007, sub-009, sub-015–sub-016, sub-018, sub-020–sub-030	Released modalities available according to repository structure	Eligible for modality-specific analyses after user-defined quality control.
sub-008	Excluded from released dataset	Recording sessions were incomplete.
sub-010–sub-014	EEG unavailable; fNIRS, physiological and behavioural data available	Exclude from analyses requiring EEG; may be used for fNIRS, ECG, behavioural, or subjective analyses.
sub-017, sub-019	Retained in repository; excluded from EEG technical validation	Distinguish repository availability from inclusion in the validation pipeline.

Table S2. Spearman correlations, raw p-values and adjusted p-values for fNIRS channels

O2Hb			
Channel	**ρ Spearman**	**adj_p**	**raw_p**
1	0.0126	0.4442	0.1388
2	0.0006	0.5543	0.4850
3	0.0159	0.3248	0.0812
4	0.0195	0.2795	0.0396
5	0.0022	0.5228	0.4140
6	-0.0020	0.5800	0.5800
7	0.0037	0.5228	0.3722
8	0.0035	0.5228	0.3784
9	0.0183	0.2795	0.0524
10	0.0085	0.4500	0.2228
11	0.0082	0.4500	0.2250
12	-0.0024	0.5800	0.5730
13	0.0021	0.5228	0.4248
14	0.0071	0.4619	0.2598
15	0.0101	0.4500	0.1840
16	0.0209	0.2795	0.0308

HHb			
Channel	**ρ Spearman**	**adj_p**	**raw_p**
1	0.0008	0.9723	0.4696
2	-0.0070	0.9723	0.7292
3	0.0047	0.9723	0.3442
4	-0.0135	0.9888	0.8840
5	0.0090	0.9723	0.2194
6	-0.0259	0.9888	0.9888
7	-0.0214	0.9888	0.9736
8	-0.0229	0.9888	0.9776
9	0.0091	0.9723	0.2036
10	0.0050	0.9723	0.3454
11	-0.0028	0.9723	0.6064
12	-0.0046	0.9723	0.6584
13	0.0026	0.9723	0.4108
14	-0.0053	0.9723	0.6932
15	-0.0059	0.9723	0.6928
16	0.0183	0.8768	0.0548

Table S3. Event-label logic for the `events.tsv` files. These files contain the columns `onset`, `duration`, and `trial_type`. Onsets and durations are expressed in seconds. In representative files, the observed `trial_type` labels are `start`, `target`, and `trigger`.

Task file	**Observed `trial_type` label**	**Interpretation**
`activemotor`	`start`, `target`	`start` indicates the beginning of the task sequence. `target` indicates active motor cues or trials.
`passivemotor`	`start`, `target`	`start` indicates the beginning of the task sequence. `target` indicates passive motor cues or trials.
`motorimagery`	`target`	`target` indicates motor imagery cues or trials. No `start` event was present in the inspected representative file.
`nback`	`start`, `trigger`, `target`	`start` indicates the beginning of the task sequence. `target` indicates target N-back stimuli. `trigger` indicates non-target N-back stimuli.
`mentalarithmetic`	`start`, `target`	`start` indicates the beginning of the task sequence. `target` indicates mental arithmetic stimuli or trials.
`nbackarithmetic`	`start`, `trigger`, `target`	`start` indicates the beginning of the task sequence. `target` indicates target trials. `trigger` indicates non-target or intermediate stimulus events.
`full`	`start`, `trigger`, `target`	`start` indicates the beginning of the task sequence. `target` and `trigger` follow the same target/non-target logic as the combined cognitive task, here embedded in the full cognitive-motor condition.