Meditation under EEG: placebo vs Q-Go vs Q-Theta

EEG pilot study (subject Barbara) — three brain states, one lost recording, and a result that unsettles

Level of evidence : Observed in-house (frontal EEG, relative power) — hypothesis-generating study, n = 1 session/condition, fixed order, non-blinded; Q-Theta EEG session lost (to be redone)

Study type	Within-subject EEG pilot, hypothesis-generating (non-confirmatory)
Participant	One adult subject (Barbara), three sessions the same afternoon
Measure	Muse S EEG (frontal sensors) + optical heart rate
Conditions	Placebo · Q-Go · Q-Theta — fixed order, ~21–23 min/session
Processing	Relative band power (% of spectrum) · effect sizes (d)
Integrity	Matched immobility (3 sessions) · Q-Theta EEG session lost (zeros)
Status	Reproducible observation to be confirmed — not proof

Summary

Third EEG installment in the series, and the richest: three meditations by one subject the same afternoon — under placebo, under Q-Go, under Q-Theta — Muse S headset, ~21–23 min each. Explicitly a hypothesis-generating study. Two things up front, one of them uncomfortable: the Q-Theta session has no band power recorded (sensor failure) — its EEG is unusable and will be redone; we own it rather than delete it. Where the data are clean (placebo vs Q-Go), the two brain states are clearly different: under Q-Go, the frontal spectrum shifts toward gamma (×1.7, large effect d = +1.10) at the expense of slow waves, with alpha staying stable. The twist: by classic relaxation indices, it is placebo that looks most “relaxed” — Q-Go does not slow the brain, it orients it toward an alert, present state. On the heart side, Q-Go shows the lowest heart rate of the three. A reproducible observation, not proof.

1. Background and objective

The usual wellness question is “does it relax you?” Ours is different: “can we measure it?” We placed an EEG headset (Muse S) on the same subject and recorded three meditations the same afternoon — placebo, Q-Go, Q-Theta — to compare brain states.

The intent is explicit: to generate clean, testable hypotheses, not to conclude. This document therefore shows the method and its failures as much as the results.

2. Method

Protocol, read without indulgence:

- Participant: one adult subject (Barbara), three sessions the same afternoon.
- Measure: Muse S EEG headset, frontal sensors; heart rate (optical) in parallel.
- Conditions: placebo (4:03 p.m.), Q-Go (4:27 p.m.), Q-Theta (5:16 p.m.) — fixed order, ~21–23 min per session.
- EEG processing: band power in RELATIVE terms (% of spectrum), which neutralizes amplitude / contact differences between sessions.
- Immobility control: median micro-movement ≈ 0.0017 in all three sessions (subject equally stable throughout).

- Status: within-subject study, fixed order, non-blinded — hypothesis-generating.

3. Data integrity — housekeeping before conclusions

Before any conclusion, the housekeeping. A study that does not show its failures is not a study — it is an advertisement.

Session	Time	Duration	Frontal contact	EEG bands
Placebo	4:03 p.m.	21 min	Perfect (100%)	Valid
Q-Go	4:27 p.m.	23 min	Perfect (100%)	Valid
Q-Theta	5:16 p.m.	21 min	Medium	Absent (zeros)

The Q-Theta session has no band power recorded: all columns Delta→Gamma are at zero (sensor failure or recording setting). Its EEG is unusable, and since the raw signal is sampled only at ~1 Hz, the bands cannot be reconstructed by frequency analysis. Clear consequence: Q-Theta cannot be compared in EEG on this run. It will be redone properly.

Two controls give confidence in the remaining comparison (placebo vs Q-Go): immobility is identical across the three sessions, and powers are read in relative terms (% of spectrum), which neutralizes amplitude and contact differences.

4. Placebo vs Q-Go — the real EEG comparison

OBSERVATION Frontal spectral profile (medians, % of spectrum) and Cohen's effect size (d).

Band	Placebo %	Q-Go %	Effect size (d)	Direction
Delta	16.5	12.4	−0.42	Q-Go ↓
Theta	14.8	11.8	−0.62	Q-Go ↓
Alpha	29.5	28.3	−0.04	≈ equal
Beta	21.4	19.8	−0.35	Q-Go ↓
Gamma	13.5	**22.6**	+1.10	Q-Go ↑↑

Only one band moves strongly: gamma, multiplied by ~1.7 (13.5 → 22.6%), with a large effect (d = +1.10). It rises at the expense of slow waves (delta −0.42; theta −0.62) and, more mildly, beta (−0.35). Alpha stays stable (d = −0.04).

So it is a "high-frequency" signature, not a "low-frequency / drowsiness" one. Under Q-Go, this subject's brain does not slow down — it shifts toward gamma.

5. The twist — "relaxed" is not "meditative"

Here is what unsettles, and we own it. By classic relaxation indices, placebo "wins": alpha/beta 1.58 (placebo) vs 1.26 (Q-Go); (alpha+theta)/(beta+gamma) 1.50 vs 0.83. Clear effects favoring placebo (d = −0.73 and −1.40).

But this is not a contradiction — it is mechanical: these ratios put gamma in the denominator, so the more Q-Go's gamma rises, the lower the "relaxation" ratio. Yet a soft relaxation — high alpha, low high frequencies — is rather the profile of someone drifting toward sleep. Q-Go's profile — high gamma, maintained alpha — looks more like vigilant presence than drowsy release.

6. How to read this gamma — two honest interpretations

Reading A — presence / mindfulness (favorable to Q-Go). High frontal gamma with maintained alpha is a signature reported in meditators in focused attention or open presence. From this angle, Q-Go does not put one to sleep: it would install an alert, present, vigilant state — often considered "superior" to simple release.

Reading B — caution (frontal gamma is ambiguous). Frontal gamma (30–44 Hz on Muse) overlaps EMG — the micro-tensions of the face and jaw. Head movement is ruled out (gamma↔movement correlation = −0.03), but without raw 256 Hz EEG, a muscular contribution cannot be fully excluded. To be confirmed.

Defensible position. The usable conditions produce distinct, robust brain states (large effects, matched immobility and contact). Whether "gamma presence" is "better" than "alpha relaxation" depends on the goal of the practice. The key point: it is measurable and reproducible, hence properly testable.

7. Heart rate

Session	Median HR (bpm)	Reading
Placebo	67.1	reference
Q-Go	**64.2**	lowest (autonomic calm)
Q-Theta	71.9	highest (+50 min → order effect)

Heart rate is the only marker available across the three sessions (EEG missing for Q-Theta). Q-Go shows the lowest (64.2 bpm vs 67.1 for placebo), consistent with greater autonomic calm.

Q-Theta shows the highest (71.9 bpm), but it was recorded ~50 min later: an order / time-of-day effect cannot be ruled out. Note: HR goes down then up — not a simple linear drift, so the Q-Go trough is a real feature of the dataset. Since optical HR can drift and the order is fixed, no firm conclusion.

8. Limitations

- Fixed non-randomized order (placebo → Q-Go → Q-Theta): any learning or time-of-day effect is confounded with the condition.
- n = 1 session per condition: no within-condition replication, impossible to separate signal from session variability.
- No documented blinding: the subject's expectation can shape the state (especially in meditation).
- Q-Theta session without EEG: powers not recorded → EEG comparison impossible for Q-Theta.
- Gamma vs EMG: without raw 256 Hz, the muscular contribution is not fully excluded.

9. Corrective protocol and next steps

To turn this signal into proof, the design must be hardened:

- Verify recording (band powers active, frontal contact checked before launch) — the Q-Theta failure must not recur.
- Randomize and counterbalance the order, balanced over several days (Latin square).
- Blind: the subject must not know which chip is the placebo (chips identical to the eye and touch).

- Replicate: ≥ 4–6 sessions per condition for real within-subject statistics.
- Standardized washout between sessions, same time of day if possible.
- Raw 256 Hz recording to decompose gamma vs EMG.
- Fix the success criterion BEFORE the run: are we targeting “relaxation” (alpha/beta) or “alert presence” (gamma + alpha)?

10. Conclusion

Three meditations, one headset, a truth shown unfiltered — including the lost session. Where the data are clean, placebo and Q-Go produce two clearly different brain states: Q-Go shifts the frontal spectrum toward gamma while keeping alpha — a vigilant-presence profile rather than drowsy relaxation — with, on top, the lowest heart rate of the three. There remains the gamma/EMG ambiguity, the fixed order, the absence of blinding, and the Q-Theta to redo. This is a reproducible observation that calls for a real study — randomized, blinded, replicated, in raw 256 Hz. Framing: a hypothesis-generating pilot study, to be confirmed, with no medical claim.

Nicolas Desjardins · DBA(c) · PhD(c) IMD · MSc in Neuroscience (in progress) — Q-Technology OÜ, Narva mnt 5, 10117 Tallinn, Estonia

Source: Muse S EEG (frontal sensors), relative band power (% of spectrum); optical heart rate. Three within-subject sessions, fixed order. Q-Theta EEG session not recorded. Unaudited internal data. Not a medical claim.