

How to Synchronize the World

Grammars of Engagement, Forty Years On — and the Instrument That Finishes Them

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In memory of Will McWhinney

1. The book that could not be finished

Will McWhinney spent the last forty years of his life writing a book called *Grammars of Engagement*. It never appeared. Every version was overtaken by the next, and when he died the manuscript was still a draft, worked on with Tim Webber, surrounded by earlier drafts that each said the same thing differently.

The usual explanation is that he kept changing his mind. That is true and it is not the reason. The reason is structural, and it is the subject of this essay.

Paths of Change had already given him four worldviews and six games. *Grammars of Engagement* was to give him the thing that happens **between** two of them: coupling. And coupling is not a concept you can settle by writing about it more carefully. It is a quantity. It has a magnitude. A book about a quantity, written without an instrument that measures it, must be rewritten forever, because each formulation is a description where a number is required.

Will worked on paper, in an age before blogs and long before cheap sensors. He had the theory of coupling and no way to read it off a living pair of people.

That instrument now costs sixty euros.

This essay collects what has been assembled in the MAZE programme — the Vacuum.Net base, the personal address, the Lohe model, the physiological synchrony literature, the sensor layer — and groups it around the book Will could not close. The claim is simple: *Grammars of Engagement* was not unfinishable. It was unmeasurable, and it is not unmeasurable any more.

2. What Will already knew

Strip the drafts to their load-bearing statements and four things stand.

Coupling is the process by which systems connect and exchange information. Not a metaphor for rapport, not a way of describing sympathy after the fact. A process, with parties, a channel and a strength.

Entrainment is the special case in which coupled systems come to operate on a common frequency. Dutch has the better word: *fasevergrendeling*, phase locking. Huygens found it in 1665 with two pendulum clocks on one wall, and church bells hanging in one tower have done it for as

long as there have been towers. People do it in dialogue, in falling in love, in watching a match together.

Phase-locked people behave as one organism. They follow a conductor, a speaker, a crowd. Will was explicit that this is not automatically benign, and he named the stadium as the architecture built to produce it.

And every signal arrives with a spectrum. Strike one bell and the surrounding bells receive an invitation, some of it harmonic and some of it so complex it registers as noise. Communication is never a single tone; it is a tone with its overtones, and what couples is not the message but the spectrum.

That last point matters more than it looks, and I return to it in §9. Will wrote it in a chapter on spectral coupling, and it is the specification for an instrument he had no way to build.

3. The central result: coupling has three regimes, not two

Here is the finding that makes *Grammars of Engagement* worth finishing, and it is the one the modern research field has mostly missed.

Will distinguishes **too little coupling**, **too much coupling**, and **right coupling**.

Too little: the signal is too weak to be received, and dissipates unheard. Nothing transfers. Two people are, in his phrase, loose sand.

Too much: the coupling overwhelms. Difference is abolished, dissonance becomes cacophony, and the pair or the group loses the capacity to carry information at all. Everyone agrees, and there is nothing left to say.

Right coupling: enough to transmit, not so much as to collapse the difference between the parties. Entrainment that permits learning, reinforcement and the formation of new channels of connection.

Coupling is therefore penalised at both ends. More synchrony is not better. There is a window, and both walls of it are real.

This is not an isolated intuition of Will's. The same shape appears in three independent places in the present programme:

- In the derivation of the human lifespan, the functional regime is *structured metastability*, not maximum synchrony, and a transition can fail in two distinct ways — too little integration to carry the reorientation, or too much synchrony to let go of the current configuration. These are different failures and must not be collapsed into one measure.
- In the self-calibration guide for the Living Winding, the personal window has an upper and a lower rim; the instrument reports both.
- In Fiske's relational modes, a mismatch of mode produces conflict — but so does the total absence of difference, which produces no relation at all.

And it is exactly where the empirical literature is weakest. Almost every published synchrony study treats synchrony as a scalar to be maximised and correlated with a good outcome. If Will is right, that design is guaranteed to produce inconsistent results, because it collapses two opposite failures onto one end of a scale. Some of the field's celebrated heterogeneity is an artefact of assuming coupling is monotone.

Prediction, stated plainly: the relation between physiological synchrony and outcome is an inverted U, not a line. That is testable with data that already exists.

4. Why the book could not close

Paths of Change was a generator. It generates games, and the games generate further games, without a terminal state. Will himself came to see that whatever followed it was already inside it.

Grammars of Engagement tried to add the dynamics: not which worldviews exist, but how two of them engage, and with what strength. And a strength is a number.

Without a number, three questions have no answers, and they are the only questions that matter:

- **How much** coupling is there right now, between these two people?
- **Where is the window** for this pair — where does too little end and too much begin?
- **Why does this pair couple easily and that pair not at all?**

Will could name all three and answer none. Each new draft was another attempt to say in prose what wanted to be read off a dial. That is why the book kept reopening: not indecision, but a genre error forced on him by the absence of an instrument.

The third question is the deepest, and it is the one this programme can now answer, because it has something Will did not have: **an address**.

5. What the base supplies

The Vacuum.Net theory derives the human being from below, and three of its results bear directly on coupling.

$\Psi^2 = 0$ — what does not close does not persist. A configuration exists only where it closes in phase on itself. Applied to a process rather than a thing: a change that does not return leaves no structure behind. This is, at human scale, precisely Will's requirement that a path of change must turn round in order to succeed. Two frameworks, no shared vocabulary, one condition.

The ladder 1–2–4–8. Closure at successive levels produces structures of dimension 1, 2, 4 and 8. At the 4-rung a closure acquires an internal orientation with three degrees of freedom: the unit quaternion, living on the three-sphere S^3 .

C6 and the two-layer law. A person is a closure in the net. What is fixed is the address — the topology, computed once from date, time and place of birth. What varies is the tension at that address. Address is topology; life is tension.

From these follows the hypothesis that carries the rest of this essay:

H1 — the four worldviews are the 4-rung of the ladder as it appears in a human closure.

If H1 holds, McWhinney's four realities are not four categories chosen for convenience. They are the four components of a closure that has closed at the fourth level: mutually irreducible, exactly four, with one normalisation constraint and therefore three degrees of freedom. A person's orientation in the net is a unit quaternion.

That Will arrived at four realities from organisational practice, independently and by a completely unrelated method, is evidence of the kind that counts: convergence on the same count and the same irreducibility from a different direction entirely.

And it gives coupling a geometry. If each person is a point on S^3 , then the distance between two people is not a metaphor. It is the angular distance along the geodesic between two unit quaternions, computable exactly, before they have ever met.

6. K is not universal

The mathematics of coupling was written after Will died, and it fits his object exactly.

Kuramoto's model (1984) describes a population of oscillators with distributed natural frequencies and a coupling strength K . Below a critical K_c the population is incoherent; above it, a fraction locks. The transition is sharp, and K_c depends on the spread of natural frequencies, not on the number of oscillators.

Lohe generalised Kuramoto to non-abelian groups, including the unit quaternions — oscillators that live on S^3 . Convergence theorems exist: given the coupling strength and the distribution of natural frequencies, one can say whether and when the ensemble phase-locks.

The Lohe model is therefore literally the engine of *Grammars of Engagement*. Its state variable is the object the blueprint already computes. Its order parameter is the magnitude of the mean quaternion — the field coherence $C(t)$ that appears in the quaternion field model of psychopathology as the measure of a relational field's integrity.

But standard Kuramoto assumes one global K . And that assumption is where every synchrony study silently fails, because it makes coupling a property of the *situation* — the task, the room, the ritual — and never of the specific pair.

The proposal of this essay is one line: K is not universal. K is a function of the angular distance between the two addresses on S^3 .

That is enough to give the field what it does not have. It says which pairs couple easily and which do not, before the measurement. It says where the window sits for a given pair. And it makes both of Will's failure modes structural rather than accidental:

- two addresses very close on S^3 — high K , easy locking, little transfer. Will's *too much*. Nothing is learned because there was no difference to carry.
- two addresses far apart — low K , difficult locking, high potential transfer if locking is achieved. Will's *too little*, unless work is done.
- an intermediate band — enough difference to carry information, enough coupling to transmit it. Will's *right coupling*, now with an interval instead of an adjective.

7. What has actually been measured

The empirical field exists, it is respectable, and it is larger than most people in the systems tradition realise. A review in *Nature Reviews Psychology* (Gordon & Bartsch, 2026) synthesises the literature and sorts the correlates of interpersonal physiological synchrony into social, performance-oriented and self-oriented families.

The strongest results:

Group decision-making. Fifty-eight groups, 271 participants, Polar H10 chest straps, a hidden-profile task designed so that the correct answer requires overriding the obvious one. Using multidimensional recurrence quantification analysis and machine learning, heart-rate synchrony predicted whether the group reached the correct consensus with better than 70% cross-validated accuracy — beating discussion duration, subjective team assessment and baseline heart rate. Published in PNAS (2024).

Cohesion. A pooled analysis across studies found that the *change* in physiological synchrony from baseline to interaction predicted the psychological sense of group cohesion, at both individual and group level, and was not modified by the context of the interaction.

Ritual and music. Elevated physiological synchrony has been reported in choral singers, string quartets, drumming groups and crowds relative to silent baselines — the modern measurement of what Will described as the conductor coupling to the audience.

Method. MdRQA is the established technique for coupling more than two physiological time series at once; recurrence-based methods are robust to outliers, heterogeneous variance and non-stationarity, which are the normal properties of long physiological recordings.

So the measurement problem is solved, the hardware is validated at consumer prices, and the analysis is off the shelf. None of it has to be invented.

8. What the field cannot answer

And yet, after decades of work, the review's own conclusion is that the psychological meaning of interpersonal physiological synchrony remains ambiguous. Methodological heterogeneity, theoretical heterogeneity, fragmentation across incompatible lenses.

Two reasons, both of which this programme addresses directly.

First: the monotone assumption. The field measures how much and correlates it with good. Will's three regimes say that design cannot converge, because the same low correlation is produced by two opposite conditions. Until studies are designed to find the window rather than the slope, the heterogeneity will persist.

Second: individual differences are measured by questionnaire. Where studies do look at who couples with whom, the predictors are traits like social anxiety and perspective-taking, obtained by self-report. One such study found social anxiety negatively predicted synchrony and that synchrony did not predict performance at all.

This is exactly the instrument the morphology argument forbids. A context-dependent system cannot be parsed by a context-free instrument — the position argued from Goethe, Turing and Chomsky in 2009 and standing in this programme ever since. A questionnaire asks a person to report, in a context-free format, a quantity that is context-dependent by construction. The answer is contaminated by self-image, by mood on the day, and by what the respondent believes about the question.

The address is not reported. It is computed. That is the whole difference, and it is the reason this programme can supply a predictor where the field cannot.

The gap, in one sentence: the field measures K and cannot explain its variance. The angular distance on S^3 is a candidate explanation that can be computed before the measurement is taken.

That is an ordinary, falsifiable hypothesis stated in the field's own language. It requires no one to accept the Vacuum.Net derivation to be worth testing.

9. The instrument

The Synchrony Meter is the first MAZE instrument to be built, and it is now clear what it is: *Grammars of Engagement*, made readable.

The hardware is trivial. A standard Bluetooth heart-rate band, roughly thirty euros, speaking the open BLE Heart Rate Service protocol. Brand-independent by design. Two of them, a browser, no server, no new mathematics. Optional extension to movement without a line of new mathematics either, because every IMU writes its orientation natively as a quaternion time series.

Four functional layers:

1. **Personal tension reading** — the four weather states of the Living Winding: loading, holding, discharge, rest, with mean tension $\bar{\chi}$ and retention time τ as the key numbers.
2. **Two-person phase coupling** — not the static composite of two addresses, but the living coupling: where in the window this pair currently sits.
3. **Almanac correspondence** — scored, dated predictions written to the ledger, so the instrument tests itself.
4. **Open sensor interface** — anyone who speaks the protocol can contribute a channel.

And the reading is not a score, it is a regime. This is the design consequence of §3, and it is what distinguishes the instrument from everything on the market. It does not say "your synchrony is 0.62". It says: *below the window, in the window, above the window*. Three states, because Will found three.

Sound closes the loop. A tone that follows the pair's own coupling is a reading, not an instruction — and it is Will's spectral coupling, built. Sonification frees the eyes: two people can walk, sit, or talk while hearing whether they are coupled. The strongest of the three possible designs is the one where both parties hear a single shared tone that only becomes clear when they lock, so that the sound *is* the measurement rather than a report about it. Timbre from the dominant colour, base tempo from the Shen phase: the address in the sound, without a line of new mathematics.

This is not Hemi-Sync. Binaural beats drive blind — a fixed preset, no measurement, no feedback. What is proposed here is the other half: a closed loop in which the signal follows the person's own rhythm. The closest validated relative is HRV resonance breathing, which locates each person's own resonance frequency by trial and error every session. The address would predict it instead.

And the prohibition holds. Instruments read the net; they never direct it. A tone that follows your own rhythm reads you. That your body then moves with it is a property of bodies, not an instruction from the instrument. The line is thin and it must be held deliberately, which is the subject of §11.

10. Up the ladder: dyad, family, group, city, world

The net is a tower. A closure of depth m sits inside larger and slower closures — family, generation, culture — and the same instrument reads at every rung, with the time constant lengthening as you climb.

The dyad. Two addresses, two bands. The angular distance is fixed before the meeting; the coupling is measured during it. The difference between the two is the interesting quantity: a distant pair that couples anyway has done work, and that work is now visible.

The family. The relational base of the support programme, and the rung where the lifespan derivation bites. Transmission from old to young is strongest where the child's entry point on the circuit coincides with the elder's exit point — Panarchy's *remember* coupling, drawn at human scale. Adolescence is *revolt*: the fast small cycle destabilising the slower large one, falling exactly where centrality's coupling to age peaks. A family weather report is not a metaphor; it is the group order parameter with the addresses known.

The group. Here the Lohe convergence theorems apply directly: which addresses act as hubs and which as leaks, and whether the ensemble is a closure or an open mesh. This is the rung Tavistock has owned conceptually for eighty years — Bion's work group and basic assumptions, Rice and the group relations conferences — and never measured. Bion's basic assumptions have never been given a physiological signature. They are candidate regimes of a coupled system and they should be measurable.

The city. A city is already partly synchronised and has never been read. Working hours, school bells, traffic light cycles, the eight o'clock news, Friday afternoon, the holidays: these are Zeitgebers, shared signals to which millions hang their rhythm. And the mathematics says the cost is low, because K_c depends on the spread of natural frequencies rather than on the number of oscillators, and a sparse network with a few hubs suffices. That is why the church bell worked: one signal, one town, no infrastructure.

The world. There are moments when a country demonstrably locks — a national two minutes' silence, a World Cup final, an attack, a state funeral. No one has ever measured one while it happened, although the hardware is on millions of wrists. And there is a permanent collective channel already running in this programme: the Tension Gauge reads the tension of the global net from seventeen market instruments, on the argument that markets are the densest available sensor of the collective human fabric. Bodies would be denser still.

Emery and Trist saw the top of this ladder in 1965 and named it: in a turbulent field the turbulence is a property of the environment itself, not of the organisations in it. That is tension in the net rather than in the knots — the same claim the MAZE programme makes, made sixty years earlier at the institute where the group relations tradition was built.

11. The line

Synchronising a population is what propaganda is. One message, one rhythm, one mood, across millions. That is not a side effect of mass media; it is the design goal. Will saw it clearly and said so: politicians have understood this since the 1930s and build the architecture — the stadium — in which the unity produces itself.

Tavistock carries a reputation on precisely this point, deserved or not. The distinction between *coupling a country* and *playing a country* is thin to the point of vanishing.

So the standing rule of this programme, which is a matter of good manners at the personal scale, becomes the only thing that separates the project from something else entirely at collective scale:

Instruments read the net. They do not direct it.

At the scale of a pair, the rule protects the person's own recognition of the moment. At the scale of a city, it is the whole ethics. What can be built, and what nobody has, is a **reading** — when does this city couple, to what, for how long, and where does it leak. What must not be built is a transmitter.

And one more consequence follows from §3, which is the deepest thing Will has to say to anyone who wants to synchronise the world. **Maximum synchrony is a failure state.** A perfectly locked population has no internal difference left and therefore cannot process information — the cacophony of too much coupling, which at collective scale has a plainer name. The goal is never more coupling. It is the window: enough to transmit, not so much as to abolish the difference that makes transmission worth anything.

Whoever wants to synchronise the world should want it only up to the second wall.

12. Predictions

Stated so that a negative result removes a component rather than requiring the model to be rescued.

S1 — Coupling is an inverted U. The relation between physiological synchrony and task or relational outcome has an interior maximum. Both tails underperform the middle. Testable on existing published datasets by re-analysis.

S2 — K depends on angular distance. The coupling strength between two people, estimated from simultaneous heart-rate recordings, is a monotone function of the geodesic distance between their two addresses on S^3 . Testable with pairs whose birth data are known, without new instrumentation beyond two bands.

S3 — Transfer is strongest at intermediate distance. What is learned or transmitted in an interaction peaks not where coupling is easiest but at intermediate address distance, where difference and coupling are both sufficient.

S4 — The transfer point is matched. Transmission from elder to child is most effective where the child's entry point on the circuit coincides with the elder's exit point.

S5 — Basic assumptions are regimes. Bion's work-group and basic-assumption modes have distinguishable signatures in group-level physiological coupling. A group in a basic-assumption mode sits in a different band of the coupling window than the same group working.

S6 — The address leaves a signature in the fast layer. Retention time τ and the daily weather pattern cluster by colour and phase across two weeks of self-measurement. If it holds, the address becomes partially readable from the tension layer — and the instrument begins to test the blueprint instead of only applying it.

S1 and S6 need no new data collection. S2 and S4 need two bands and a handful of pairs.

13. The dance

Will opened his book with a line from Eliot's *Little Gidding* about there being, in the end, only the dance. He meant it as a statement about coupling: no beginning, no end, no middle way, only the ongoing engagement between parties who are neither identical nor separate.

He was right, and he could not finish the book, because a dance has a tempo and he had no way to read it.

Everything assembled here is one instrument and one number. The instrument is two heart-rate bands and a browser. The number is the coupling strength between two closures, which the base says is a function of the angular distance between their addresses — computable before the meeting, measurable during it, and bounded on both sides by walls that Will found by thinking and that the sensors can now find by measuring.

Paths of Change was a generator that generates generators without a goal. *Grammars of Engagement* was the attempt to say what happens when two of its products meet. It could not close in prose, for the same reason that a path which does not return leaves nothing behind: it lacked the term that would let it come back to itself.

The term was a measurement. It costs sixty euros now.

For Will, who saw the whole thing forty years early and only lacked the sensor.

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