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Your Time, Whose Science? On Tempo Reviewability in Human Movement Research

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ABSTRACT

Who owns research tempo? In human movement research, the problem of acceleration is not simply that research moves too quickly, but that institutional timelines increasingly shape what can be asked, observed, published, and credited. This field makes temporal governance especially visible because many of its central phenomena – recovery, learning, aging, adaptation – are constituted by their temporal structure. Funding horizons, evaluation windows, protocol timelines, publication-mediated visibility, policy urgency, and career clocks can become tightly coupled, making some forms of inquiry easier to complete and others professionally risky to sustain. This article examines how such coupling can compress research into auditable outputs while displacing the time required for follow-up, interpretation, repair, and care onto those with the least temporal slack. It then develops time-attuned science as a procedural framework for making research timelines explicit, reviewable, and revisable when temporal misfit threatens validity or justice. The framework is organized around tempo reviewability, tempo adequacy, and three procedural tests: tempo-fit, tempo justice, and reflexivity. The aim is not to oppose speed or to defend slowness as a virtue, but to make the adequacy of research tempo open to justification, contestation, and warranted revision.

KEYWORDS

Time-attuned science; tempo reviewability; temporal governance; tempo justice; research evaluation; kinesiology

From acceleration to accountable research timelines

Consider an older adult participating in a study on fall prevention. In the months following a fall, recovery is rarely linear: confidence may return slowly, gait patterns may reorganize unevenly, and the risk of subsequent falls may remain elevated long after apparent physical recovery (Hausdorff, 2005). For the participant, the question is whether they can regain the freedom to move safely. For the researcher, the question is when to measure, how long to follow up, and when to stop. These are not merely logistical choices. They are methodological decisions about whether recovery – as a lived and changing process, not only as a set of scores – can appear in the data at all.

That study is also conducted within an institutional setting. Grant calls have deadlines. Projects have reporting periods. Doctoral and postdoctoral contracts have fixed durations. Journals operate through review and publication cycles. National research assessments

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count outputs within defined windows. These are not simply expressions of “time” in the abstract. They are events that organize academic action: when a question must be proposed, when data must be collected, when results must become reportable, and when work can count as merit. The problem addressed here is therefore not time as a metaphysical category, but a recurring pattern in which inquiry becomes coupled to event-structured durations that are often set before the temporal demands of the phenomenon are fully known. This pattern should not be overstated. Funders, journals, disciplinary cultures, research teams, and policy settings differ considerably in their temporal logics. The argument advanced here identifies a recurrent form of temporal governance, not a uniform description of human movement research as a whole.

This distinction matters because human movement research often studies phenomena that unfold as trajectories rather than isolated events: recovery, rehabilitation, learning, adaptation, fatigue, aging, injury, return to play, confidence, and embodied participation. What counts as change depends on when it is sampled, how long it is followed, and whether delayed, cyclical, non-linear, or fragile dynamics are allowed to become visible. A study that closes too early may not simply offer an incomplete account; it may produce a different object of knowledge. The issue, then, is not that institutional time necessarily corrupts inquiry. It is that unexamined institutional timing can become epistemically consequential: it may determine, in advance, how long a phenomenon is allowed to remain observable, interpretable, and credible.

The question, then, is not whether research should be fast or slow. Fast research can be necessary, responsible, and methodologically appropriate. The more precise question is whether the timeline of inquiry is adequate to the temporal structure of what is being studied. Critical time studies and science and technology studies (STS) have long shown that institutional time is not a neutral container: it sequences work, assigns urgency, creates obligations, and differentiates feasible action from delay or deviation (Adam, 1990; Nowotny, 1992; Rosa, 2013; Vostal, 2016). Research proceeds through recurring formats – deadlines, cycles, milestones, review windows, reporting periods – that do not merely track activity but help constitute it (Orlikowski & Yates, 2002). Once these formats harden into performance expectations, temporal efficiency can become a selection criterion: questions are filtered by whether their temporal profile can be proposed, funded, completed, audited, and credited within the relevant cycle (Adam, 2004; Ylijoki, 2013).

It is important to be precise about the nature of this problem. The relevant unit of analysis is tempo: the governed parameters that make a research timeline binding – horizon, cadence, sequencing, stopping logic, review authority, and consequences for deviation. Speed is a description of rate. Tempo is the organization of pacing under conditions of authority. A follow-up window directly shapes inference; a funding deadline pre-authorizes duration; a journal cycle affects circulation; a platform cadence structures measurement; a career clock shapes what forms of delay are professionally survivable. These parameters matter most when they operate together rather than in isolation. When they become tightly coupled, research pacing may become less responsive to the temporal structure of the phenomenon and more responsive to institutional rhythms set before inquiry begins.

This organization of research pacing through institutional events is what I call *temporal governance*. Its consequences are especially visible in human movement research because the field often studies change as it is lived over time: recovery after a fall, confidence rebuilt after injury, adaptation across training cycles, aging across uneven bodily trajectories. Such

phenomena become intelligible only through decisions about sampling, follow-up, and temporal granularity. Yet dominant infrastructures often privilege time-bounded designs, standardized protocols, and high-frequency publication and assessment cycles, with documented consequences for transparency, power, reproducibility, and reporting practices in sport sciences and kinesiology (Hicks et al., 2015; Mesquida et al., 2023; Rushforth & de Rijcke, 2015; Rushforth & Hammarfelt, 2023; Twietmeyer, 2025).

When metrics become decision-relevant, the assessment window functions as a selection environment: it steers attention toward what can register as performance within the cycle and away from work whose inferential value matures late or travels poorly as countable output (Hicks et al., 2015; Wouters et al., 2019). In a field where change is often lived as a trajectory rather than captured in a single point, compressed timelines do more than shorten research; they alter what becomes visible, how it is interpreted, and whose movement can be recognized as meaningful change.

Applied sport science makes this tension particularly visible. Practitioners often need timely information for training, recovery, and performance decisions (Malone et al., 2019). This urgency is real. But urgency becomes epistemically risky when “what works now” is treated as equivalent to “what holds” (Kretchmar, 2005). Work on sport science translation and corresponsive sport science has shown persistent friction between the decision cycles of practice and the slower rhythms of verification, implementation, and learning (Fullagar et al., 2019; Woods et al., 2024). The point is not to oppose application, but to recognize that application has its own temporal ecology. In applied contexts, the task is therefore not to slow practice from the outside, but to distinguish between decisions that must be timely and claims that require longer evidential support.

The same pattern appears across research infrastructures, although these sites should not be treated as equivalent. Funding calls pre-authorize duration; protocols translate temporal assumptions into follow-up windows, endpoint conventions, and stopping rules; bibliometric systems shape how completed work circulates and becomes visible; and evaluation systems convert outputs into credit within fixed periods. A follow-up window has a more direct inferential effect than a promotion cycle, and a protocol endpoint is not the same kind of device as a journal deadline. Their significance lies in coupling: when institutional clocks that are not themselves methodological begin to constrain methodological timing, phenomenon-responsive pacing can be displaced by calendar-responsive optimization (Adam, 2004; Felt, 2017; Franssen et al., 2018; Gill, 2009; Ylijoki, 2013). The result is not simply faster research, but a narrowing of what can be asked, observed, and recognized as knowledge.

This article builds on the earlier proposal of *tempo giusto* – the “right time” – as a normative counterpoint to acceleration in human movement research (Ramalho et al., 2025). The present argument does not simply restate that proposal. It gives it a procedural form. If temporal misfit is produced through identifiable institutional sites, then the response cannot be a general appeal to slow down. It must specify where research pacing is set, who has authority to contest it, what counts as evidence of misfit, and how re-pacing can occur without being converted into professional exposure or administrative failure.

The contribution of the article is therefore twofold. First, it reframes acceleration as temporal governance: not an atmosphere of academic busyness, but a set of event-structured durations that organize feasibility, credibility, and merit. Second, it develops time-attuned science as a procedural framework for making research timelines explicit,

reviewable, and revisable when temporal misfit threatens validity or justice. Time-attuned science does not mean attunement to time in the abstract. It means attending to the concrete durations, sequences, deadlines, review points, and closure rules through which research is conducted and evaluated. In this hierarchy, temporal governance names the diagnostic problem; time-attuned science names the procedural response; tempo review-ability names the mechanism through which that response becomes actionable.

The remainder of the article follows this path. First, it shows how research timelines are installed across key institutional registers and how their coupling can generate a pattern I call *chrono-epistemic extractivism*. Second, it develops time-attuned science as a procedural response: first by specifying three procedural tests – tempo-fit, tempo justice, and reflexivity – and then by translating these tests into institutional and project-level levers. The conclusion returns to the question that gives the article its title: when a research timeline is defined in a particular way, who benefits, who bears the cost, and what forms of movement knowledge are made possible or excluded?

Where research tempo is installed, and who pays for it

The previous section reframed acceleration as a problem of research timelines: institutional events often decide, in advance, what can be proposed, observed, completed, published, and credited. This section makes that claim inspectable. The aim is diagnostic rather than moralizing. The question is not whether speed is good or bad in itself, but how research timelines become binding, auditable, and consequential, and who bears the costs when inquiry is forced into calendars set for other purposes. The section therefore distinguishes between temporal arrangements that directly shape inference and those that shape feasibility, circulation, recognition, or professional risk. These arrangements should not be collapsed into one mechanism, but their interaction can make research tempo difficult to contest. Two questions guide the section: where are timelines pre-authorized, and what happens when the burden of staying “on time” is displaced downstream?

Six institutional registers where tempo is set

Research time is assembled through interlocking registers that make duration binding: deadlines, cycles, milestones, reporting periods, review windows, protocol sequences, platform cadences, and career thresholds. These arrangements do not merely track research activity; they organize what can count as feasible, timely, and complete (Adam, 2004; Orlikowski & Yates, 2002). The six registers identified below are recurring sites of temporal governance. They do not operate identically in every research context, nor are they always coupled with equal force. Their value is diagnostic: they show where research tempo is set before it appears as a methodological choice. For human movement research, this matters because many central phenomena become researchable only through temporal design decisions: recovery, learning, rehabilitation, training adaptation, seasonality, competitive calendars, and aging all depend on choices about sampling, follow-up, cadence, interpretation, and closure.

The first register is **grant-cycle time**. Funding calls, project timelines, deliverables, and reporting obligations often arrive before inquiry has begun, pre-authorizing what can be proposed as feasible and later recognized as successful (Franssen et al., 2018; Ylijoki, 2013).

In major public-funding regimes, model agreements specify deliverables, reporting calendars, amendment procedures, and admissible grounds for revision, turning project time into compliance architecture (European Commission, 2024). The friction is predictable: calendarized closure can collide with phenomena that resist neat project arcs – multi-year functional decline, expertise development, slow co-production with communities or care settings, and trajectories that do not stabilize within a single reporting cycle (Zapata-Restrepo et al., 2024). Project funding does not necessarily prevent good longitudinal or collaborative work, but it can make longer or more uncertain temporal profiles harder to propose, justify, and protect.

The second **register is bibliometric time**. Bibliometric and assessment systems install a circulation tempo through publication-mediated visibility, journal hierarchies, citation windows, and output-counting periods. These systems do not simply record scholarly value; they shape what becomes visible, citable, and countable (Espeland & Sauder, 2007; Hicks et al., 2015; Larivière et al., 2015). Journal Impact Factor is one example: visibility within the metric's cycle can shape submission choices before publication itself (Rushforth & de Rijcke, 2015). Across grant-cycle and bibliometric time, timeliness becomes synchronization: outputs must circulate within the period in which they can be credited, while durability work – extended follow-up, replication, reanalysis, and the adjudication of ambiguity – is often discounted because it rarely pays off in the same window (Rushforth & Hammarfelt, 2023; Wouters et al., 2019). This does not mean that bibliometric systems determine research design directly. Their influence is usually mediated through incentives, reputational economies, and assessment cultures. Yet these mediations matter because they help define which forms of work appear timely, productive, and institutionally valuable.

The third register is **protocol, data-generation, and measurement time**. Here, temporal assumptions become methodological commitments. Assessment spacing, seasonal scheduling, wash-in periods, endpoint conventions, exclusion windows, and stopping rules specify when effects are expected to appear and how long ambiguity will be tolerated before being treated as null, noise, or failure (Felt, 2017; Pickering, 1995; Timmermans & Berg, 2003; Wylie, 2024). This register has direct inferential force: it determines what temporal patterns a study can and cannot detect. Where digital or device-mediated measurement is used, cadence is further naturalized through update frequencies, prompts, alerts, adherence scores, and compliance dashboards (Lupton, 2016; Wajcman, 2015; World Health Organization, 2019). The methodological risk is tempo substitution: the rhythm of the platform begins to stand in for the rhythm of the phenomenon. In human movement research, this risk is especially acute when platform cadence is mistaken for bodily cadence: a device may sample frequently without necessarily capturing the temporal structure of recovery, adaptation, fatigue, confidence, or participation.

The fourth register is **epistemic incubation time**. Durable knowledge depends not only on data collection, but also on time for reformulation, interpretive return, reanalysis, negative results, theoretical revision, and repair (Berg & Seeber, 2016; Stengers, 2018; Ylijoki, 2013). This is not merely “thinking time” added after data gathering. It is part of how findings become meaningful, especially when signals are ambiguous, delayed, or context-dependent. These forms of work often have weak institutional visibility because they do not travel easily as timely, auditable artifacts. When incubation is squeezed, “doable” questions proliferate: projects conform to available templates rather than remain responsive to the phenomenon's temporal demands. The result is not simply acceleration,

but conceptual conservatism under speed (Gill, 2009; Ylijoki, 2013). This register is particularly important for movement research because the meaning of change often emerges after return, comparison, contextual interpretation, and engagement with trajectories that do not become intelligible at the first analytic pass.

The fifth register is **career-clock time**. Doctoral limits, fixed-term contracts, promotion timelines, probation periods, and assessment cycles convert duration into professional exposure. Early-career researchers are therefore steered toward designs that register quickly, often at the expense of longitudinal cohorts, sustained partnerships, replication, or labor-intensive interpretive work (Gill, 2009; Loveday, 2018). Design horizons may begin to mirror employment horizons, even where inferential timing would justify longer follow-up. Career-clock time does not have the same direct methodological status as a sampling interval or endpoint convention, but it strongly shapes which methodological choices remain professionally survivable. Its epistemic effect is therefore indirect but consequential: it does not itself decide when an outcome should be measured, but it can make some temporally adequate designs professionally irrational for those without protected slack.

The sixth register is **policy time**. Briefing-ready evidence is often privileged because policy rhythms are organized around electoral cycles, fiscal years, institutional reporting, and urgency regimes (Adams et al., 2009; Funtowicz & Ravetz, 1993; Jasanoff, 2004; Nowotny et al., 2001). In human movement research, the mismatch is predictable: maintenance of physical activity, functional recovery, reconditioning, prevention, adaptation, and public-health change unfold over time, while policy demand often asks for evidence that can travel quickly and support near-term decisions (World Health Organization, 2020). The problem is not policy relevance, but the conversion of urgency into a default evidential horizon. When this happens, evidence that is useful for immediate decision-making may be mistaken for evidence of durable change, and the temporal limits of policy-ready knowledge can disappear from view.

These registers do not operate in the same way and should not be treated as equivalent. A distinction must be drawn between decisions with direct inferential consequences and those with infrastructural or professional consequences. Some decisions – follow-up horizon, sampling cadence, endpoint timing, exclusion windows, stopping rules, and measurement cadence – determine what a study can detect. Others – funding cycles, assessment windows, publication rhythms, career clocks, and policy deadlines – shape what can be proposed, sustained, published, credited, and acted upon. Their significance lies in interaction rather than equivalence: institutional clocks that are not themselves methodological become epistemically consequential when they constrain methodological timing. This distinction is central to the argument. Temporal governance is not a single clock imposed on research from above; it is a patterned coupling of heterogeneous clocks whose effects depend on where they enter the research process and who has authority to revise them.

When registers converge: extractive duration and temporal load

Viewed together, the six registers show how research tempo is installed as an institutional bundle. Different clocks authorize duration, impose obligations, and preselect which temporal profiles can count as feasible inquiry. The problem is coupling: heterogeneous temporal formats become synchronized so that they converge on the same actors at once, shrinking slack and making long-horizon inquiry structurally precarious (Whitley & Gläser,

2007; Ylijoki, 2016). In that situation, temporal constraint becomes governance: being “on time” across funding, publication-mediated visibility, protocols, measurement infrastructures, careers, participant interfaces, and policy becomes mutually reinforcing eligibility rather than a contingent virtue. The claim is not that such coupling is always present, or always equally strong, but that when it occurs it changes the practical conditions under which temporal adequacy can be defended.

When this coupling tightens, timeliness stops functioning merely as a coordination tool and begins to operate as an implicit condition of credibility. Phenomenon-responsive pacing is displaced by calendar-responsive optimization. Follow-up drifts toward administratively legible endpoints. Ambiguity is tolerated only if it can be resolved within the cycle. Coordination, repair, and interpretation are pushed downstream (Felt, 2017; Gill, 2009; Ylijoki, 2013). The object of inquiry is no longer simply the phenomenon; it becomes the phenomenon as cropped to fit the institutional calendar. For movement research, the risk is not only that studies end sooner, but that recovery, learning, aging, adaptation, or participation are reconstructed as cleaner, shorter, and more linear than they are.

I call this configuration *chrono-epistemic extractivism*. The term is used in a restricted sense. It does not describe every fast study, every deadline, or every institutional demand, nor does it imply malicious intent. What is extracted is temporal capacity: slack, continuity, follow-up, interpretation, and repair time. These capacities are secured and converted upstream into schedule-compliant credibility, while the work required to make inquiry durable is displaced downstream as routine time debt (Adam, 2004; Felt, 2017; Valkenburg, 2022; Ylijoki, 2013).¹ Speed is not extractive by definition. It becomes extractive when tempo authority is unaccountable, temporal costs are externalized, and those asked to absorb delay have little power to pause, re-pace, or return without penalty. The concept is therefore diagnostic rather than accusatory: it names a configuration in which the benefits of temporal compliance and the burdens of temporal repair are asymmetrically distributed.

The epistemic risk is concrete. Delayed, multi-phase, or non-linear dynamics can be misread as null, noise, or failure because horizons and sampling cadences were set for administrative legibility rather than temporal adequacy (Mitchell & James, 2001). Under coupling, closure becomes a design attractor: follow-up horizons drift toward the shortest defensible endpoint, stopping rules converge toward early termination, and narratable before-and-after arcs become structurally advantaged because they circulate and count “on time.” In movement research, where the object is often a trajectory rather than a point, compression does not simply shorten timelines. It changes what the field can observe, interpret, and legitimate as change. This is why temporal misfit is not merely a planning problem. It can become an epistemic problem: the study may remain technically well executed while being temporally misaligned with the phenomenon it claims to understand.

The costs of this compression are not evenly distributed. Some actors can defend delay as methodological integrity: extended follow-up, iteration, reanalysis, interpretive return. Others experience the same delay as breach, non-competitiveness, or career exposure. Tempo authority is therefore the unequal power to set, renegotiate, and defend research pacing as warranted procedure rather than personal preference (Acker, 2006; Orlikowski & Yates, 2002; Valkenburg, 2022). Within research collectives, the work that keeps studies “on schedule” – rescheduling participants, chasing missing data, repairing protocols, smoothing handovers, maintaining devices, updating documentation – is temporally costly and

epistemically consequential, but often weakly credited as intellectual contribution (Star & Strauss, 1999; Ylijoki, 2013). At the participant interface, travel, scheduling labor, device upkeep, repeated prompts, fatigue, and the ongoing work of staying “data-ready” shape equity, retention, and what trajectories can enter the record at all (Aiyegbusi et al., 2024; Kabacińska et al., 2020). Thus, the problem is distributive as well as methodological: the capacity to absorb, contest, or repair temporal misfit is unequally held.

The diagnostic payoff is empirical. If temporal coupling is tightening, we should expect traces: concordance between planned follow-up horizons, reporting milestones, and evaluation windows; design horizons that mirror contract lengths; endpoint choices shaped by publication or policy cycles; platform cadences treated as default analytic cadences; long-horizon inquiry becoming professionally risky; or burden-linked missingness concentrated where participation is least temporally subsidized (Aiyegbusi et al., 2024; Kabacińska et al., 2020; Mitchell & James, 2001). These traces would not prove chrono-epistemic extractivism by themselves, nor would they appear identically across subfields. Their value is heuristic and empirical: they identify where temporal coupling may be examined rather than merely asserted. The preceding diagnosis is therefore a map of the problem: where research tempo is installed, how coupling can become extractive, and who bears the costs of staying on institutional time.

Toward a time-attuned science for human movement

The task now is to specify a procedural response. This section develops time-attuned science as a framework for making research timelines explicit, reviewable, and revisable when temporal misfit threatens validity or justice. The framework is not a general plea for more time, nor a rejection of timely research. It is a way of asking whether a given research tempo is adequate to the phenomenon, the claim, and the distribution of temporal burden. The response is organized in two steps. First, three tests for reviewing research tempo, which define the framework and its three procedural tests: tempo-fit, tempo justice, and reflexivity. Second, a proposal for re-governing tempo where it is already decided, which translates those tests into concrete levers at the institutional and project levels.

In human movement research, this response cannot be treated as merely administrative. Learning, recovery, adaptation, aging, and return to participation have evidential signatures that are themselves temporal. Movement is not only measured; it is lived, sustained, interrupted, and relearned (Kretchmar, 2000, 2007). A phenomenological reading sharpens this point: embodied change is not simply an object placed inside time, but a process through which time is inhabited and reorganized (Merleau-Ponty, 1962; Standal & Moe, 2011). For this reason, decisions about research tempo are also decisions about the conditions under which movement can become knowable as change.

Three tests for reviewing research tempo: tempo-fit, tempo justice, and reflexivity

Time-attuned science is a procedural approach to research timing. It begins from a simple premise: decisions about follow-up, cadence, sequencing, and closure are not merely logistical. They shape what evidence can be produced. Its central standard is tempo adequacy: the fit between the temporal profile of the phenomenon, the claims being made, and the design’s temporal commitments. A temporally adequate study is not

necessarily a long study; it is one whose duration, cadence, and closure logic are justified in relation to what it claims to know.

Tempo adequacy becomes usable through tempo reviewability: the capacity to state temporal assumptions, assess them against signals of misfit, and reopen timelines without treating warranted revision as failure. A reviewable timeline does not simply ask whether a study is “on time.” It asks why this timeline was chosen, what temporal dynamics it can detect or miss, who bears its costs, and what would count as evidence that it is no longer adequate. Tempo reviewability is therefore the procedural mechanism through which temporal adequacy can be examined rather than presumed.

The framework is organized around three tests. Tempo-fit asks whether the timeline can detect the phenomenon it claims to study. Tempo justice asks who carries the temporal burden of making that timeline work. Reflexivity asks whether tempo-setting decisions can be made explicit, contested, and revised when misfit becomes visible. These tests are analytically distinct but practically interdependent: a timeline may be inferentially efficient yet unjustly burdensome, ethically sensitive yet epistemically too short, or methodologically plausible yet impossible to renegotiate once misfit appears.

Tempo-fit

Tempo-fit treats pacing as a condition of validity. Inquiry tempo should be justified in relation to the phenomenon’s temporal structure rather than inherited from administrative calendars, publication rhythms, or available templates (Bergson, 1889/1910; Felt, 2025). In human movement research, processes such as motor learning, rehabilitation, post-stroke recovery, training adaptation, aging, and confidence rebuilding after injury or falls are time-constituted (Ballester et al., 2019; Brashers-Krug et al., 1996; Seidler et al., 2010). If such processes are forced into short follow-ups, pre – post windows, or standardized stopping rules, the problem is not only simplification but possible inferential distortion (Timmermans & Berg, 2003; Wylie, 2024). The relevant question is not whether compression occurs, since all research necessarily delimits time, but whether the chosen delimitation remains adequate to the phenomenon and to the claim being made.

The practical test is whether the study can state what temporal patterns it can and cannot detect. Compression should not disappear into logistics; it should be defended against what the inferential aim plausibly requires (Felt, 2017). Tempo-fit therefore asks for alignment between the phenomenon’s plausible dynamics, the method’s detection envelope, and the interpretive time required when signals are ambiguous, delayed, or context-dependent (Pickering, 1995; Timmermans & Berg, 2003; Ylijoki, 2013). Where the phenomenon’s temporal profile is uncertain, that uncertainty should be monitored through legitimate points for review and revision rather than resolved by default into the shortest feasible horizon (Holling, 1978). In this sense, uncertainty about timing is not a defect to be hidden at design stage; it is a condition to be made reviewable.

Tempo justice

Tempo justice treats time as a distributed research condition. Timelines allocate burdens, protections, slack, and temporal risk (Acker, 2006; Valkenburg, 2022). Where timeliness is treated as excellence, coordination, delay, uncertainty, and care are often displaced onto those with the least temporal slack, while tempo privilege concentrates where institutional and symbolic capital are strongest (Gill, 2009; Minello, 2020). Epistemic injustice and care

scholarship clarify why this matters: knowledge depends on conditions under which experience can become intelligible, and those conditions often require coordination, trust-building, maintenance, and time (Fricker, 2007; Mol, 2008; Puig de la Bellacasa, 2017). Tempo justice therefore asks not only whether the research timeline works, but for whom it works, at whose cost, and with what protections against downstream displacement.

At the participant interface, time includes not only minutes in a laboratory, but travel, fatigue, device upkeep, repeated prompts, scheduling around care or work, and the effort of remaining data-ready. These burdens shape who can participate, who remains enrolled, and which trajectories stay observable (Aiyegbusi et al., 2024; Greenhalgh et al., 2019; Vargemidis et al., 2020). Within research collectives, the same logic applies to early-career researchers and precarious teams, for whom long-horizon designs may convert epistemic ambition into career risk (Gill, 2009; Ylijoki, 2013). The distributive test is whether temporal burdens are budgeted, credited, and protected upstream, and whether re-pacing rights are enforceable for those who bear the costs (Moher et al., 2020; Star & Strauss, 1999). In movement research, this distributive question is inseparable from validity: when time burdens shape attrition, adherence, missingness, or participation, they also shape what trajectories become available as evidence.

Reflexivity

Reflexivity makes tempo authority governable. Decisions about follow-up horizons, sampling cadence, stopping rules, evaluation windows, and platform defaults are also decisions about whose time counts, whose time can be spent, and who has standing to renegotiate pace without penalty (Jasanoff, 2004; Nowotny, 1992). Institutions exercise temporal power not only by demanding speed, but by imposing tempo on some actors while protecting the slack of others (Sharma, 2014). Reflexivity is therefore not an invitation to introspection alone; it is a requirement to identify where temporal authority sits and how it may be challenged.

Reflexivity therefore treats temporal formats as governance devices, while recognizing that they do not all function identically. A funding cycle pre-authorizes duration differently from a protocol endpoint; a platform cadence structures measurement differently from a career clock. The point is not to collapse these distinctions, but to make each site available for scrutiny according to the kind of temporal authority it exercises. This also matters because timeliness norms are historically situated rather than neutral benchmarks; when exported as universal templates, they privilege some rhythms of knowing over others (de Sousa Santos, 2014). A reflexive account of tempo must therefore specify not only the timeline itself, but the authority through which that timeline becomes difficult to refuse.

The reflexive test is procedural: projects and institutions should identify where tempo is set, by whom, on what grounds, with what authority for revision, and under which evidential triggers extension, pause, redesign, or re-pacing counts as methodological integrity rather than slippage (Felt, 2017; Wylie, 2024). Reflexivity is therefore not simply disclosure. It is the design of conditions under which temporal defaults can be contested and revised. Without such conditions, transparency may merely document temporal misfit without giving anyone the standing to act on it.

Together, the three tests make timing accountable. Tempo-fit asks whether the timeline can support the claim. Tempo justice asks who pays for that timeline. Reflexivity asks whether the timeline can be reopened when misfit becomes visible. Rigor, justice, and

accountability are therefore not separate aspirations added after the fact; they are procedural requirements for treating timing as part of method. This is the core claim of time-attuned science: research tempo becomes rigorous when it can be justified, distributively examined, and revised in response to evidence of misfit.

Re-governing tempo where it is already decided

The three tests are not abstract values. They become useful only when directed at the mechanisms through which research tempo is already fixed. Funding agreements already define project duration; protocols already justify endpoints and follow-up; ethics committees already review burden and protection; assessment systems already judge contribution; platforms already enforce cadence; and publication systems help convert completed work into visible and assessable output. Time-attuned science does not require an entirely new bureaucracy. It asks existing mechanisms to do temporal work more explicitly. The aim is to reuse existing points of review rather than multiply administrative procedures.

The operational premise is simple: where timing is fixed by procedure, there should also be a defined route for review and revision. The question is therefore not what additional clock should be added to research governance, but how existing clocks can be made accountable to tempo adequacy. A funding deadline, a protocol endpoint, an assessment window, an ethics procedure, a platform cadence, and a publication outlet do not operate in the same way. Each fixes, filters, or converts tempo differently. Each should therefore be made reviewable according to the kind of temporal authority it exercises. This differentiated approach matters because the same remedy cannot apply equally to funders, protocols, journals, ethics committees, platforms, and career systems. and contracting. Funding is where project duration is most explicitly authorized. Grant agreements already contain timelines, milestones, deliverables, reporting schedules, amendment procedures, and, in some systems, no-cost extensions. These are not peripheral administrative devices; they are instruments through which research time is made feasible or infeasible, and project-based funding has been shown to shape what kinds of inquiry can be proposed, sustained, and recognized as epistemically productive (Franssen et al., 2018; Ylijoki, 2016). Read through time-attuned science, these mechanisms could be used to ask whether the proposed duration is adequate to the temporal structure of the phenomenon, not merely whether it fits the funding cycle.

A time-attuned funding process would therefore require temporal justification alongside other design justifications. Proposals should state why their follow-up horizon, sampling cadence, sequencing, and stopping logic are adequate for the phenomenon under study. A familiar model already exists: sample-size justification tied to a smallest effect size of interest. The same logic can be extended temporally. A proposal should state not only how many participants are needed, but how long they must be followed if an effect may emerge slowly, non-linearly, cyclically, or after a delay (Lakens, 2022). This would not make all projects longer. It would make duration accountable to inference. In movement research, such justification is especially relevant where outcomes concern recovery, learning, adaptation, retention, relapse, return to participation, or functional maintenance over time.

Existing amendment procedures could also be reinterpreted. If misfit appears mid-course – delayed onset, unanticipated attrition, participant burden, seasonal disruption, or trajectory divergence – re-pacing should not automatically be treated as poor planning. It

can be a validity safeguard when the original timeline no longer matches the phenomenon. Administrative devices such as no-cost extensions already acknowledge that project time may need revision; time-attuned governance asks that such revision be available not only as managerial exception, but as methodological responsibility when temporal misfit is evidenced (National Institutes of Health, 2024). In this sense, funding mechanisms already contain the rudiments of tempo reviewability. They need to be evaluated as such. The key shift is interpretive: extension, pause, or redesign should be assessed according to whether it protects the validity and fairness of the inquiry, not only whether it disrupts the administrative plan.

Evaluation and career systems

This is where research time is most visibly converted into merit. Hiring, promotion, annual review, performance-based funding, publication counts, citation indicators, and national assessment exercises translate duration into productivity by asking what has been produced, circulated, and credited within a given window. Cycle-based systems such as the Research Excellence Framework (2025) make this temporal governance explicit by defining the period within which outputs must exist to count. What can be completed and made visible within short windows is often read as productivity, while work requiring long follow-up, interpretive repair, replication, sustained relationships, or slow implementation may appear low-yield (Gill, 2009; Loveday, 2018; Ylijoki, 2013).

Time-attuned science does not require abandoning evaluation. It requires evaluation systems to stop treating speed-compatible outputs as proxies for epistemic adequacy. Studies of performance-based funding and publication indicators have shown that assessment systems can shape researcher behavior and publication practices, not merely record them (Bloch & Schneider, 2016; Butler, 2003). Selection pressures that reward output rates can also push methods toward what is fast, clean, and publishable, even when reliability suffers (Smaldino & McElreath, 2016). Research-assessment scholarship has repeatedly shown that indicators alone cannot capture quality, contribution, or epistemic value without expert judgment and contextual interpretation (Aksnes et al., 2019; Hicks et al., 2015; Wilsdon et al., 2015).

Here, too, mechanisms already exist. DORA, CoARA, Leiden's Recognition & Rewards, and UK Research and Innovation (UKRI) all move assessment away from narrow metric proxies and toward broader accounts of contribution (Cagan, 2013; Coalition for Advancing Research Assessment (CoARA), 2022; Leiden University, 2024; UKRI, 2025). A time-attuned extension would add a temporal dimension to these instruments. Researchers could be invited to state what temporal horizon a contribution required, what temporal misfit was managed, what interpretive or repair work was necessary, and what was deliberately not compressed because compression would have threatened validity (Bordignon et al., 2023; Moher et al., 2020). This would make tempo visible as part of methodological competence rather than as a private cost absorbed by those with the least career slack.

Such a shift matters especially for early-career researchers. If long-horizon work remains professionally risky, then tempo-fit becomes a privilege rather than a standard of rigor. Evaluation systems can therefore enact tempo justice by recognizing contributions whose value matures late: longitudinal follow-up, replication, negative results, data stewardship, sustained participant relationships, implementation work, and careful interpretive return.

The aim is not to reward slowness as such, but to prevent short-window productivity from becoming the default measure of intellectual worth. For movement research, this matters where strong work may require prolonged contact with participants, repeated measurement, seasonal or training-cycle sensitivity, implementation follow-up, or interpretive return to complex trajectories.

Project-level safeguards: protocols, ethics, participation, and the temporal audit

Because higher-level reforms remain uneven, projects need minimal safeguards inside inherited systems. Protocols, preregistrations, ethics applications, reporting standards, platform settings, and staffing plans already contain temporal assumptions, but these assumptions are usually dispersed across documents rather than reviewed as a coherent temporal design. A compact temporal audit could consolidate them in one place. Its purpose would be practical rather than symbolic: to make the temporal logic of a study visible before misfit becomes invisible failure, attrition, overclaiming, or unpaid repair work.

Such an audit would not create a new bureaucratic layer. It would make existing temporal decisions reviewable. It could be appended to a protocol, preregistration, ethics application, Registered Report, or study plan, and would state four things: the plausible temporal dynamics of the phenomenon; the design's detection envelope, including what it can and cannot temporally resolve; likely collisions between institutional, participant, platform, and staffing clocks; and pre-declared signals of tempo misfit that would justify pause, extension, redesign, re-pacing, or a narrowing of claims (Felt, 2017; Star & Strauss, 1999; Ylijoki, 2013). By locating these assumptions together, the audit would prevent temporal reasoning from being scattered across documents where no one is responsible for reviewing it as a whole.

Registered Reports offer one hybrid publication – protocol route for bringing temporal adequacy into design-stage scrutiny, because they allow assumptions about design and interpretation to be examined before results are known (Chambers, 2013; Chambers & Tzavella, 2022). In a time-attuned use of this model, authors could specify not only hypotheses, analytic plans, and sampling decisions, but also the proposed horizon, cadence, stopping logic, and interpretive window. Where temporal uncertainty is foreseeable, protocols could predefine what would justify pause, extension, redesign, or a narrowing of claims. This would not give journals managerial authority over project time; it would make temporal reasoning part of protocol-level credibility.

Transparency standards can support this project-level function in a narrower but important way. Their value is not that they solve temporal misfit, but that they make design choices, deviations, reporting expectations, and evidential limits inspectable (Nosek et al., 2015). In time-attuned terms, transparency is most useful when it clarifies the temporal conditions of inference: follow-up horizon, sampling cadence, timing of outcomes, deviations from planned timing, attrition patterns, and limits on the temporal reach of conclusions. The aim is not to make every study longer, but to prevent compressed designs from producing claims that exceed their temporal warrant.

This audit would also make participant burden operational rather than merely ethical in a general sense. In human movement research, participation may involve travel, fatigue, device maintenance, repeated prompts, scheduling around care or work, and the ongoing effort of remaining data-ready. These burdens affect equity, retention, missingness, and which trajectories remain observable (Aiyegbusi et al., 2024; Greenhalgh et al., 2019; World

Medical Association, 2024). A time-attuned audit would therefore specify how participant time will be monitored, what burden thresholds would trigger adaptation, and how pauses or missed data will be documented without automatically being treated as non-adherence. This is particularly important when “non-compliance” may in fact signal temporal overload, poorly fitted cadence, or insufficient accommodation of participants’ lives.

Taken together, these mechanisms show that time-attuned science is not primarily an appeal for more time. It is a way of reusing existing governance instruments differently. Funding mechanisms can ask whether duration is inferentially justified. Evaluation systems can recognize work whose value matures late. Project-level safeguards can make temporal assumptions, burdens, deviations, and limits on claims explicit. Publication remains relevant only insofar as it helps make the temporal scope of claims visible rather than allowing conclusions to travel beyond the horizon that produced them. The practical test of such re-governance would be observable: fewer routine collapses toward the tightest coupled clock, more documented tempo renegotiations without penalty, and less reliance on invisible time debt to sustain institutional timeliness.

Reclaiming tempo as a condition of knowledge and justice

This article began from a discomfort that has become ordinary in contemporary academia: human movement research is not merely experienced as rushed; it is governed through research timelines that decide what can be asked, observed, completed, published, and credited. The preceding sections have argued that this is not primarily a problem of individual haste or cultural acceleration. It is a problem of temporal governance. Research time is installed through interlocking registers – grant cycles, bibliometric windows, protocol templates, platform cadences, career clocks, participant-interface demands, and policy calendars – that can become tightly coupled and difficult to reopen. Under these conditions, timeliness no longer functions only as a tool of coordination; it also helps determine what is treated as credible research. The central issue is therefore not speed itself, but the point at which temporal compliance begins to substitute for temporal adequacy.

This article identified six institutional registers where research tempo is set. It showed that these registers do not operate identically: some have direct inferential consequences, while others shape feasibility, circulation, and professional survival. When they converge, the result is a recurring configuration that the article has named *chrono-epistemic extractivism* – not a description of every deadline or fast study, but a pattern in which temporal capacity is secured upstream as auditable output while the costs of making inquiry durable are displaced downstream. Those costs are unevenly distributed. They fall most heavily on early-career researchers, precarious teams, under-resourced institutions, participants, and communities whose time quietly subsidizes institutional timeliness. The concept is useful only if kept within this restricted meaning: it names an asymmetry in the distribution of temporal capacity, not a general accusation against all institutional scheduling.

In response, time-attuned science was developed as a procedural framework for re-governing tempo. Its central standard is tempo adequacy: the fit between the temporal profile of the phenomenon, the claims being made, and the design’s temporal commitments. Its core mechanism is tempo reviewability: the capacity to state temporal assumptions, assess them against signals of misfit, and reopen timelines without treating warranted revision as failure. Tempo-fit, tempo justice, and reflexivity operationalize this framework

by asking, respectively, whether a timeline can support the claim, who bears its burdens, and whether it can be contested and revised when misfit becomes visible. Put more simply: temporal governance names the problem; time-attuned science names the response; tempo reviewability is the mechanism through which that response becomes actionable.

The operational program is not a call for virtue, nor a generalized argument for slower science. It is a set of institutional and project-level levers that can work through mechanisms already available in research systems. Funding should license tempo adequacy as rigor and treat warranted extensions as safeguards of validity rather than signs of poor planning. Evaluation and career systems should stop treating short-window output and publication speed as proxies for competence, especially where duration is a property of the phenomenon. At the project level, protocols, ethics applications, preregistrations, reporting schedules, staffing plans, and, where relevant, platform settings can be brought together through a compact temporal audit, so that timing decisions, temporal burdens, deviations, and the temporal scope of claims become explicit and reviewable. These changes would not require a wholesale redesign of research governance. They would require a shift in how existing mechanisms are used: timing would no longer appear as a background administrative condition, but as part of the methodological work through which evidence is produced, interpreted, and valued.

This is also a distributive question. When timelines are defined primarily by grant cycles, visibility pressures, or evaluation calendars, the main beneficiaries are those already able to convert timely output into institutional credit: well-resourced teams, senior researchers with protected slack, publication and assessment systems that reward work once it becomes visible and citable, and funders whose reporting structures privilege deliverables within predefined periods. Those most exposed are early-career researchers whose careers depend on rapid outputs, under-resourced teams with little temporal slack, participants whose bodies and schedules are treated as adjustable buffers, and phenomena whose delayed, cyclical, or non-linear dynamics cannot be detected within compressed horizons. This distribution matters epistemically as well as ethically. If some actors can defend time as rigor while others experience time as risk, then the field's capacity to study temporally complex phenomena is itself unequally organized.

The point, then, is not to romanticize slowness or abolish deadlines. Deadlines are not the enemy; the problem begins when temporal compliance becomes a substitute for epistemic adequacy. A time-attuned field treats tempo as part of method: a condition of interpretability, durability, and non-extractive participation. It asks not "how fast can this be done?," but "what tempo does this phenomenon require, and who will bear the cost if we get it wrong?" This reformulation is especially important for human movement research, where recovery, learning, aging, adaptation, and participation are not simply measured across time but constituted through time.

The title question – your time, whose science? – is therefore not rhetorical. It is a test of accountability. A research system that cannot say whose time it spends, whose timelines it protects, and whose phenomena it prematurely closes cannot claim temporal neutrality. Reclaiming tempo as a condition of knowledge and justice means making those decisions visible, contestable, and revisable. Only then can warranted re-pacing appear not as delay, but as fidelity to the phenomenon, to the participants, and to the integrity of inquiry. The promise of time-attuned science is not that it will make research slower. It is that it can make research tempo answerable to what is being

studied, to those who sustain the work, and to the kinds of knowledge the field claims to produce.

Note

1. I use “extractivism” as a governance analogy rather than a moral label. In political ecology, extractivism describes one-way appropriation logics in which value is captured upstream while costs are displaced onto others, later, or elsewhere (Gudynas, 2013; Svampa, 2019). In adjacent debates on data and knowledge, capture and enclosure likewise describe how lived capacities can be converted into auditable assets for profit, prestige, or control (Couldry & Mejias, 2019; Zuboff, 2019). The transposition here is deliberately narrow: the object is temporal capacity, and the concern is its asymmetric appropriation and downstream displacement.

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