Bridging Science and Coaching: Towards a Science-led, Human-centred Approach to Personal and Organisational Wellbeing

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Abstract: The rapid acceleration of artificial intelligence, combined with the post-Covid normalisation of remote and cross-time zone working, has reshaped how people live and work. While these shifts bring real advantages – efficiency, flexibility, global connectivity and knowledge sharing – they are also quietly eroding social interaction, diminishing work-life boundaries and reducing individual agency. The impact on health, mental wellbeing, career confidence and organisational performance is unpredictable and deeply concerning. In response, demand for coaching at personal and organisational levels is rising. Coaching offers something rare: a non-judgemental, personalised space where individuals and teams can slow down, explore interconnected areas of life and build strategies that fit their goals. Although proven impactful, coaching remains largely unregulated, with limited scientific frameworks guiding practice. This paper argues that chronobiology – the science of intrinsically generated biological rhythms and their interaction with the world around us – may offer an additional evidence base coaching has been lacking. Within this field, chrono-metabolomics studies how metabolic profiles change across the 24-hour day, and how modern disruptions such as jet lag, shift-work, meal timing and poor sleep can alter these profiles, affecting health and wellbeing. Chronobiologically informed coaching could therefore support people in understanding their chronotype, improving behavioural habits and making better lifestyle choices – not through prescription, but through awareness and informed choice. Crucially, this respects the coaching boundary: the coach's primary role is not to advise, but to equip people with knowledge to make empowered, personalised decisions. Grounded in the author's experience as both a practising coach and chrono-metabolomics researcher, this paper calls for a new conversation between the sciences and personal development – one where coaching becomes the bridge that makes biological science practical and human-centred. By mapping chronobiology research alongside the real-world challenges individuals bring to coaching sessions, this conceptual-review paper offers a starting framework for both communities to build upon together.

Keywords: Chronobiology, Chrono-metabolomics, Coaching, Circadian health, Wellbeing, Human-centred leadership

1. Introduction

The COVID-19 pandemic led organisations to rapidly adapt to remote and hybrid working practices. This provided greater flexibility, which in turn increased efficiency in how people worked and communicated around the world. People began working across time zones through platforms such as Zoom and Microsoft Teams. This led to frequent travel across time zones to build and maintain in-person connections. The result has been greater global connectivity, knowledge sharing and flexibility at both the individual and organisational levels.

Now, fast forward a few years, and we are dealing with another crisis or blessing, in the form of the rapidly evolving field of artificial intelligence (AI). AI has made many aspects of work more efficient, providing external perspectives, acting as a critique of our work and taking over repetitive tasks. However, these benefits may come at a cost, including reduced human interaction and a decreased reliance on personal agency. With these rapid changes in both personal and workplace culture, efforts are rightly being made at the organisational level to keep humankind adaptable and connected. Yet the evolving AI landscape is affecting individuals and organisations faster than previously predicted, creating challenges ranging from career uncertainty to impacts on personal wellbeing.

A growing evidence base suggests that coaching can positively influence wellbeing, resilience, performance and goal attainment, although outcomes vary according to context, coaching approach and the quality of the coaching relationship. Meta-analyses report consistent positive effects on performance, wellbeing, coping, work attitudes and goal-directed self-regulation (Theeboom *et al*., 2014; Jones *et al*., 2016; Athanasopoulou and Dopson, 2018). A first randomised controlled trial using professional external coaches found that coaching enhanced goal attainment, resilience and workplace wellbeing while reducing depression and stress (Grant *et al*., 2009). The quality of the relationship between coach and client appears to be an important factor in these gains (Graßmann *et al*., 2020). Consistent with previous meta-analyses, Cannon-Bowers *et al.* (2023) found that organisational coaching has a positive effect on workplace outcomes. The authors highlighted several priorities for future research, including clearer specification of the coaching approach, the expected and targeted outcomes, coaches' credentials, and the mechanisms of action through which coaching produces its effects. Despite this evidence, and although some tools and techniques are in wide use, the coaching industry as a whole remains largely unregulated and is often perceived as lacking a strong scientific foundation.

This conceptual paper is written from the perspective of someone who lives in two contrasting worlds: a practising coach and a chrono-metabolomics researcher. Scientific disciplines often generate highly specialised knowledge, whereas coaching focuses on integrating multiple dimensions of human experience. Both perspectives provide valuable insights, but they typically operate at different levels of analysis. The argument presented here is that, in a rapidly changing world driven by AI, there is an increasing need for adaptability, fluidity and interdisciplinary human-centred communication, where different disciplines can learn from and benefit one another.

The intention of this paper is to i. introduce coaching and how it supports individuals, ii. to introduce a scientific field – chronobiology, and iii. begin building a bridge between these two worlds. This is offered not as a revolutionary or groundbreaking claim, but as a small step towards finding a common language that allows each field to inform and support the other. In doing so, it speaks directly to the question at the heart of this mini-track: what it means to remain human in organisations reshaped by AI, by relentless targets and by the expectation of constant availability.

The contribution of this paper is not to propose a new coaching methodology, nor to present new chronobiological findings. Rather, it proposes a conceptual framework through which chronobiological knowledge may be translated into personalised reflection and behaviour change through coaching conversations. In doing so, it seeks to establish a common language between two disciplines that rarely interact despite addressing many of the same human challenges. The proposed framework in this paper awaits empirical testing and is not yet an evidence-based intervention.

2. What is Coaching?

International Coaching Federation (ICF) defines coaching as "Partnering with clients in a thought-provoking and creative process that inspires them to maximise their personal and professional potential." Although several definitions exist for coaching, there is considerable overlap with other interventions such as mentoring and counselling (Passmore *et al*., 2013). Coaching draws on a range of psychological approaches, including positive psychology (Theeboom *et al*., 2014), and covers various approaches and models. Common examples include the four-step GROW model (Goal, Reality, Options and Way Forward) (Grant, 2011), cognitive behavioural coaching (Neenan and Palmer, 2013; Ducharme, 2004), and Appreciative Inquiry (Cooperrider *et al*., 2005).

Coaching provides a safe and non-judgemental space in which individuals or teams can explore challenges, reflect on their experiences and consider future actions. It offers an opportunity to slow down, gain perspective and develop greater self-awareness. Importantly, the coach does not primarily advise, diagnose or prescribe solutions, but facilitates reflection through questioning, listening, paraphrasing and appropriately challenging patterns of thinking, enabling clients to develop greater self-awareness and identify actions that are meaningfully their own (Deiorio and Hammoud, 2017).

A typical coaching journey may begin with a discovery session, during which the coach and client determine whether they are a suitable fit to work together. Agreements are made regarding expectations, boundaries and the structure of future sessions. In the initial sessions, the coach and client often identify the key areas of life or work that the client would like to develop. This may be facilitated through coaching tools, although tools are not always necessary.

One commonly used tool is the Wheel-of-Life, which encourages individuals to examine their lives holistically across multiple domains, such as career, relationships, personal development, physical wellbeing, environment and finances. The client assesses their current level of satisfaction in each area and compares it with where they would ideally like to be. Areas showing the largest discrepancy may become priorities for coaching, with the intention of identifying opportunities for growth and gradually reducing the gap between the current and desired state. Based on these reflections, goals may then be developed using the SMART framework: Specific, Measurable, Achievable, Relevant and Time-bound, helping to translate broad aspirations into actionable steps.

In subsequent sessions, the structure often becomes more fluid and responsive to the needs of the client. Depending on what the client brings, a coach may work at different levels from practical environment and behaviour through to capabilities, values and identity using tools such as values exercises, visualisation or future-self work to explore these dimensions.

The COM-B model (Michie *et al*., 2011) (Figure 1) proposes that any behaviour (B) requires three interacting components: capability (C), opportunity (O) and motivation (M). Therefore, behaviour change requires modification of at least one of these components, although the component or combination of components

requiring change will depend on the behaviour and its context. Capability refers to the psychological and physical ability to perform a behaviour, including factors such as knowledge, mental skills, strength and stamina. Opportunity includes external factors that enable or prompt a behaviour, including the physical environment, such as time and resources, and the social environment. Motivation refers to the internal processes that enable, energise or inhibit a behaviour, including both conscious decision-making and more automatic processes such as habits and emotional responses.

These components interact dynamically with one another and with behaviour, creating feedback loops that may support or hinder behaviour change. It is this behavioural lens that the present paper uses to integrate chronobiology, since it is at the practical level of everyday conditions and habits that chronobiology has most directly to offer. From this perspective, changes in capability, opportunity and/or motivation may create more supportive conditions for sustainable behaviour change, while chronobiology may add an important temporal dimension by considering how these conditions vary across the 24-hour day.

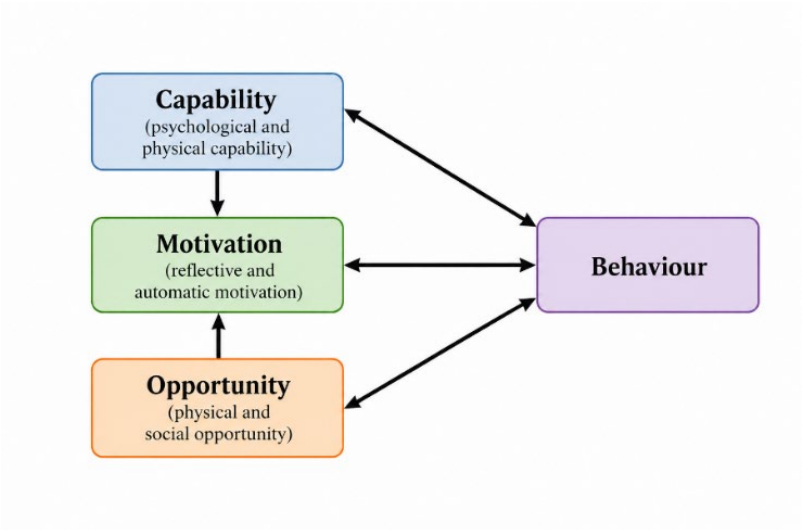


Figure 1: The COM-B model of behaviour (after Michie et al., 2011), in which capability, opportunity and motivation interact to influence behaviour

Coaching may provide a particularly suitable mechanism for translating chronobiological knowledge into practice because it already operates through personalised reflection, behaviour exploration and goal setting. Unlike population-level interventions, coaching focuses on the individual/small-group level specific circumstances, constraints and motivations. As such, it offers a means through which scientific knowledge can be translated into personalised reflection and behaviour change without removing the individual's autonomy and choice. This is particularly relevant for chronobiology, where evidence is often generated at the population level but behavioural implementation ultimately occurs at the level of the individual.

3. Where Does Chronobiology fit Into This?

AI-enabled workplaces increasingly operate across time zones, facilitate asynchronous communication and blur boundaries between work and rest. As a consequence, questions of biological timing, recovery and adaptation become increasingly relevant to both individuals and organisations. The next question is how science – and in this case chronobiology – fits into all of this. Before answering, it is helpful to set the coaching perspective aside for a moment and explain chronobiology from a researcher's point of view.

3.1 The Circadian System and Chronotype

Every nucleated cell in the human body has a clock. A central pacemaker in the suprachiasmatic nuclei (SCN) of the hypothalamus coordinates a network of peripheral clocks, generating rhythms with a period close to 24 hours – known as circadian rhythms (from the Latin *circa* meaning "about" and *diem* meaning "day"). These rhythms are synchronised, or entrained, to the Earth's 24-hour rotation on its axis by external time cues, known as 'zeitgebers' (Figure 2). The most powerful of these is the light-dark cycle, which signals the SCN through a dedicated neural pathway from the retina. Besides the light-dark cycle, meal-timing and physical activity also play vital roles as time-givers (Blume *et al*., 2019). The endogenous melatonin rhythm is a reliable phase marker

of this central clock (Lewy *et al*., 1999). When internal time and external time cues align, physiology runs smoothly; when they do not, the cost accumulates.

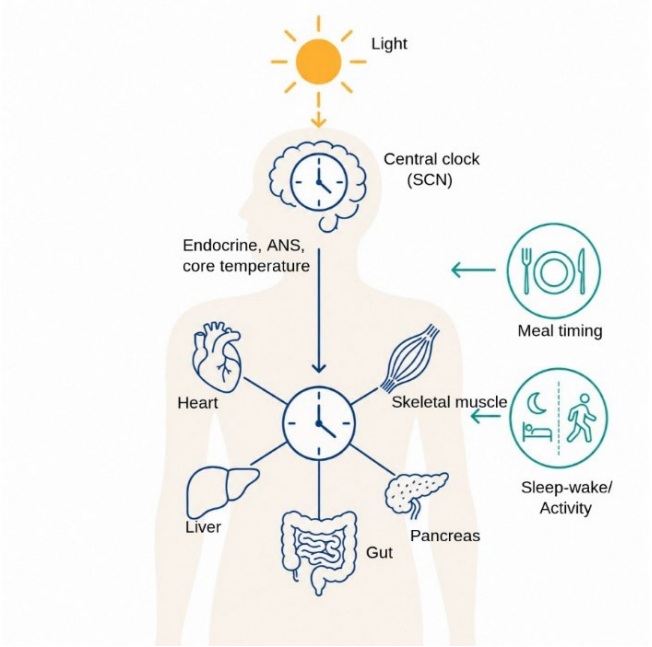


Figure 2: Hierarchical organisation of the human circadian timing system. Light is the principal zeitgeber, entraining the central clock in the SCN. The SCN in turn synchronises self-sustaining peripheral clocks throughout the body, such as those in the heart, skeletal muscle, liver, pancreas and gut, through endocrine signalling, autonomic nervous system (ANS) output and rhythms in core body temperature. These peripheral oscillators are additionally entrained by behavioural cues, principally the timing of food (meal timing) and the sleep-wake/rest-activity cycle

Individuals also differ systematically in their preferred timing of sleep and activity, a trait known as 'chronotype'. This is often described as a spectrum from early 'larks' to late 'owls', with most people somewhere in between. Because social and working schedules rarely accommodate this variation, many people live with a chronic mismatch between their biological time and their social time. Wittmann *et al*. (2006) termed this 'social jetlag' and reported that later chronotypes tend to accumulate sleep debt on workdays and report greater distress, concluding that work and school schedules should accommodate chronotype where possible. For a coaching client, the experience of being 'useless before eleven' may be less a failure of discipline than a predictable feature of their biology.

3.2 Metabolism Across the 24-Hour Day

Chrono-metabolomics is a branch of chronobiology that measures the products of metabolism – metabolites – across the 24-hour day. Studies using this approach demonstrate that a substantial proportion of circulating metabolites, including lipids, acylcarnitines and amino acids, exhibit distinct 24-hour rhythms. These rhythms may arise from endogenous circadian regulation, driven by central and peripheral clocks, and/or from exogenous diurnal influences driven by behavioural and environmental cycles such as sleep/wake and feeding/fasting (Skene *et al*., 2018).

Circadian misalignment associated with shift-work has adverse cardiometabolic implications (Scheer et al., 2009). The 24-hour metabolite profiles are also altered during simulated shift-work, as demonstrated by studies comparing plasma metabolite and lipid profiles following simulated day-shift and night-shift schedules (Skene *et al*., 2018; Khan Sullivan *et al*., 2026). While circadian timing, assessed through melatonin and cortisol rhythms, shifted very little under the night-shift condition, the majority of rhythmic metabolites tracked the imposed sleep-wake and feeding-fasting cycles rather than the central clock. This indicates that, for many metabolites, behavioural timing is a strong driver of their daily rhythms. Acute sleep deprivation can likewise alter the 24-hour profiles of plasma metabolites (Davies *et al*., 2014; Honma *et al*., 2020). Emerging evidence also indicates that meal timing can influence daily metabolic rhythms, and aligning meals with the body's active daytime phase may offer supportive benefits for metabolic health (Flanagan *et al*., 2021).

3.3 Modern Disruptors of Circadian Health

The disruptions that chronobiology studies are not abstract. They are the daily reality of many people who may seek coaching including healthcare workers and nurses on rotating shifts, first responders, pilots and frequent flyers crossing time zones, and caregivers and new parents whose sleep and daily routines are broken for months or years at a time. The biological consequences of this misalignment are increasingly well documented.

In a controlled laboratory study, Scheer *et al*. (2009) showed that when participants ate and slept around 12 hours out of phase with their habitual times, leptin (a hormone involved in satiety and energy balance) fell, glucose rose despite higher insulin, the daily cortisol rhythm was reversed and blood pressure increased; several otherwise healthy participants reached postprandial glucose levels typical of a pre-diabetic state. At the epidemiological scale, Kecklund and Axelsson (2016) reviewed the wider literature and reported associations between shift work and raised risk of Type-2 Diabetes, coronary heart disease, stroke and certain cancers, alongside accidents attributable to sleep loss. Circadian disruption, is not merely a matter of feeling tired; over time it is associated with measurable changes in metabolic and cardiovascular health.

4. Building the Bridge Between Coaching and Chronobiology

In coaching practice, individuals often describe work situations, daily routines and personal circumstances that appear closely connected to factors already well understood within chronobiology. One individual may describe reduced motivation during the winter months. Another may report fatigue associated with frequent international travel. Others struggle with irregular schedules, shift-work, poor sleep or difficulty maintaining work-life balance. These experiences are often discussed in coaching as behavioural or environmental challenges, yet many of them also have biological and circadian dimensions. This observation forms the basis of the proposed bridge between coaching and chronobiology.

The intention of this paper is not to argue that coaching should become a scientific intervention, nor that chronobiology should replace coaching. It also does not propose immediate large-scale organisational policy change. Instead, the argument is that chronobiology-informed coaching may offer value at the individual or small-group level, where people can explore how biological timing, light exposure, sleep, travel patterns and work schedules may influence their daily functioning.

This approach could be developed in two complementary ways. First, coaches could be supported to recognise when evidence-based chronobiological principles may be relevant to a client's experience, while remaining within the boundaries of coaching practice. Second, chronobiology researchers and coaching practitioners could work together to develop clear, accessible and trustworthy guidance for real-life scenarios. Such guidance would not function as a prescription or cure, but as a set of evidence-informed considerations that clients may choose to explore within coaching conversations. At the same time, there is an opportunity for chronobiologists and coaching practitioners to work together to develop responsible, human-centred recommendations that support awareness, reflection and informed choice.

5. Integrating Chronobiology Within a Behaviour-change Coaching Framework

Chronobiology-informed coaching can be introduced as contextual information that helps clients reflect on the conditions shaping their energy, mood, focus and recovery. Here, the COM-B framework (Michie *et al*., 2011), which considers behaviour as influenced by capability, opportunity and motivation, is used to introduce chronobiology-informed behaviour changes. The framework has begun to be applied within the sleep domain, for example to design interventions supporting access to evidence-based therapy for insomnia (Alkhaldi *et al*., 2024), though its application to chronobiological behaviour within coaching remains unexplored to the author's knowledge.

Within this framework (Figure 3), chronobiological awareness may support 'capability' by helping clients understand how biological timing, sleep-wake, light exposure and meal timing can affect daily functioning. It may also highlight 'opportunity', by drawing attention to the environmental and social conditions that support or disrupt healthy rhythms, such as access to natural daylight, workplace lighting, home-working arrangements, seasonal change, shift schedules, time-zone changes and social timing demands. Finally, it may influence 'motivation', by helping clients connect chrono-informed habits with personally meaningful goals, such as improved wellbeing, concentration, confidence, performance or work-life balance.

At the 'behavioural' level, this may include reflection on meal timing, physical activity, light and screen exposure, travel routines, work patterns and recovery practices. None of these factors is unattainable; rather, they are

small, adjustable parts of modern working life. Explored through coaching, they promote self-awareness: discussable, customisable and, within realistic limits, adjustable.

In this approach, chronobiology provides an evidence-informed language through which the client can explore how their environment and behaviours shape their rhythms, and how those rhythms relate to their personal goals. Coaching then supports the client to identify small, context-sensitive experiments aligned with their values and circumstances.

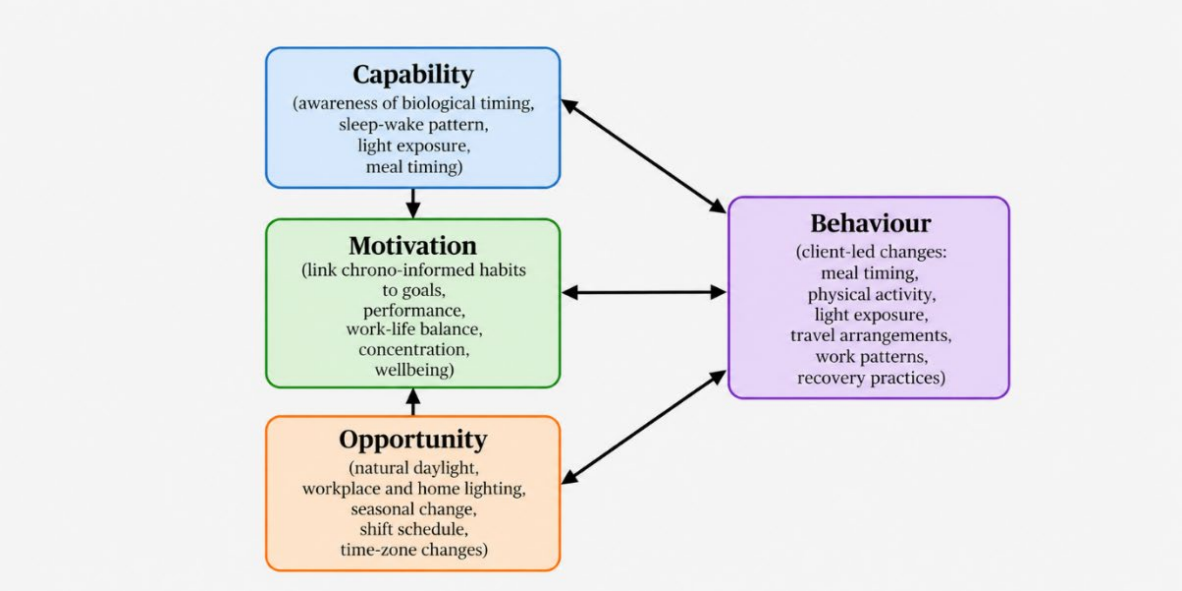


Figure 3: Chronobiological factors mapped onto the components of the COM-B model. Capability, opportunity and motivation interact to shape behaviour; chronobiology enters as contextual information the client may choose to explore

6. Illustrative Example: Low Motivation in Winter

Consider a client who reports: "I feel less motivated and productive during the winter." A traditional coaching approach might explore what has changed recently at work and personal life, what meaning they are attaching to the experience, and what they would like to be different. A chronobiology-informed perspective adds a further set of questions: in which season does this occur, and at what time-of-day is the feeling strongest? How much morning light does the person receive, and how much time do they spend outdoors? Has their sleep timing changed? The coach is simply broadening the range of questions available for exploration. The coach might, for instance, share the evidence-based observation that outdoor daylight – even on an overcast day – is substantially brighter than typical indoor lighting and plays an important role in regulating circadian rhythms, sleep and mood (Blume *et al*., 2019), thereby equipping the client to make an informed decision.

7. Towards a Practical Framework

One possible output of this interdisciplinary approach is a framework that combines coaching-based reflective questions, chronobiology-informed screening questions and, where appropriate, evidence-based considerations the client may choose to explore. Table 1 illustrates how this might look in practice.

Table 1: An illustrative framework linking common situations to coaching questions, chronobiology-informed questions and evidence-based considerations

Situation	Coaching questions	Chronobiology-informed questions	Potential chronobiology considerations
Frequent travel across time zones	Why is this work pattern important to you?	How often do you travel, and how do you adjust afterwards?	Jet lag and circadian adaptation (Giusti *et al*., 2026)
Shift-work fatigue	How is this affecting your personal goals and wellbeing?	What shift pattern do you work?	Circadian disruption, sleep timing and cardiometabolic risk (Kecklund and Axelsson, 2016)

Situation	Coaching questions	Chronobiology-informed questions	Potential chronobiology considerations
Poor energy during the day	What patterns have you noticed?	When do you sleep, eat and exercise?	Chronotype and the timing of daily behaviours (Wittmann *et al*., 2006)

The aim is not to provide medical advice or to replace existing coaching approaches. Rather, it is to create a shared language through which coaching and chronobiology can complement one another and support individuals in navigating an increasingly complex and rapidly changing world.

8. Future Research

Future research could evaluate the feasibility and effectiveness of chronobiology-informed coaching through pilot studies in populations particularly vulnerable to circadian disruption, such as shift workers, frequent travellers and remote workers operating across time zones. Such studies would help determine whether integrating chronobiological awareness into coaching conversations leads to measurable improvements in wellbeing, behaviour change or organisational outcomes.

9. Limitations

This paper is conceptual in nature and does not present empirical evidence for the effectiveness of chronobiology-informed coaching. The coaching profession encompasses a diverse range of approaches and levels of training, making generalisation difficult. Furthermore, chronobiological evidence is often derived from population-level studies and may not apply equally to every individual. Consequently, the framework proposed here should be viewed as a starting point for interdisciplinary discussion rather than a validated intervention.

10. Conclusion

Coaching provides a structured yet flexible process through which individuals can explore challenges, develop self-awareness and identify personalised actions that are meaningful within their own context. It allows people to experiment, reflect and adapt through an iterative trial-and-learning approach. Rather than applying a one-size-fits-all solution, coaching recognises that sustainable change usually emerges from personalised strategies that fit an individual's circumstances, values and goals.

From this perspective, chronobiology-informed coaching should not be viewed as a prescriptive intervention. Chronobiological knowledge can instead serve as an additional lens through which individuals better understand their behaviour, environment and daily experiences. Evidence-based considerations may then be explored collaboratively within the coaching process and adapted according to individual needs and responses. If such approaches show positive outcomes at the individual level, they may provide proof-of-concept for larger studies, organisational interventions and, eventually, workplace policies. The purpose of this paper, however, is not to advocate immediate large-scale implementation, but to encourage dialogue and exploration between disciplines that have traditionally operated separately.

The central argument is that there is a growing need for inter-disciplinary communication, collaboration and research. As work, technology and society continue to evolve rapidly, meaningful solutions are increasingly likely to emerge from the integration of diverse perspectives rather than from isolated disciplines working independently. A bottom-up approach, beginning with individuals and small-scale practical applications, may offer a realistic and human-centred pathway towards translating chronobiological knowledge into everyday practice. Through greater collaboration between coaches, researchers, organisations and individuals, it may be possible to develop approaches that are both scientifically informed and practically relevant to the challenges of modern life.

Chronobiology already has evidence-based answers for many everyday challenges – sleep, shift-work, jet lag, chronotype and meal timing – while coaching provides a personalised, human-centred mechanism for helping individuals explore and implement change. The bridge between them could be chronobiology-informed coaching.

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Ethics Declaration: This is a conceptual-review paper that draws solely on previously published, publicly available literature. No new data involving human participants or animals were collected or analysed, and ethical clearance was therefore not required for the work reported here.

AI Declaration: The author used generative AI tools to support language refinement, structural editing, and clarity of expression during preparation of this manuscript. The author takes full responsibility for the intellectual content, accuracy of references, interpretation of literature and final submitted version.

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