

What preset time schedule will it be? Rethinking daylight saving time

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José María Martín-Olalla 

Departamento de Física de la Materia Condensada,
Facultad de Física, Universidad de Sevilla, Sevilla, Spain

Jorge Mira 

Departamento de Física Aplicada and iMATUS,
Facultade de Física, Universidade de Santiago de
Compostela, Santiago de Compostela, Spain

Abstract

We discuss the foundations of the seasonal clock policy in view of a recent review article.

Keywords

chronotype, circadian misalignment, DST, latitude, sleep deprivation, summer time

The review article on seasonal clock regulations recently published in *Time and Society* (Neumann and von Blanckenburg, 2025) provides a valuable summary of the current academic perspectives, covering the health, economic, and societal impacts. The review, which is quite orthodox, unsurprisingly concludes with the authors endorsing permanent winter time as the best of the three options.

We have a critical opinion of this point of view and still do not see any smoking-gun evidence against the current practice, which happens to be just one of the many complexities that synchronizes the way of life in modern

Corresponding author:

José María Martín-Olalla, Departamento de Física de la Materia Condensada, Facultad de Física, Universidad de Sevilla, ES41012 Sevilla, Spain.
Email: olalla@us.es

extratropical societies (Martín-Olalla and Mira, 2025a). If anything, these review articles prompt us to ask dangerous questions: Why did such a seemingly inconvenient practice, with numerous negative effects, arise in the first place? And why has it persisted for so long in many places? The UK abandoned year-round winter time in 1916, just after they first tested clock changing. Many major cities in the US followed the same path: once summer time was tested, there was no turning back.

Answering these questions requires rethinking the purpose of clock regulations and looking back to their foundations. Neumann and von Blanckenburg (2025) describe the practice as an alteration of the social clock relative to the sun clock, asserting that the “effect of altered sunrise and sunset times is the origin of all impacts.” We have previously warned of the risks of this approach when thoroughly analyzing seasonal clock changes. In our opinion, it is safer to focus on what actually happens: clock changes alter local time—and thus social time schedules, which are synchronized to local time. It is not that sunrise (and sunset) times are altered—delayed after the spring change—but rather our time schedules are altered; we wake up earlier (and go to bed earlier) in spring-summer because 8 am summer time is just a proxy for 7 am winter time.

Why such behavior? Surprisingly, Neumann and von Blanckenburg (2025) note the case of the Spanish National Assembly in 1810, which “decided to hold its sessions 1 h earlier in the summer months. *In this way, the sessions were adapted to the varying morning brightness levels throughout the year* [emphasis ours]. This concept already contains the main aspects of DST [daylight saving time] used today,” and the proposal by Hudson (1898) and Willet (1907), “based on the same underlying desire to mitigate the seasonal effects of early sunrises.”

Indeed, physiologists explain that “morning light” (morning brightness) plays a central role in keeping us aligned to the 24 h day (Crawford et al., 2025). This role is critical to understanding why there is little human activity in the dark hours of the morning—compared with the activity in the dark hours of the evening—and, indirectly, is critical to understanding why permanent summer time is often rejected. But it is also critical to understanding why individuals and societies ended up preferring early activation in spring-summer and late activation in autumn–winter (Martín-Olalla and Mira, 2025c). This is the foundation of modern seasonal DST and was noted by Hudson (1898).

We may agree that “adapting to the varying morning brightness levels”—or “the desire to mitigate the seasonal effects of early sunrises”—sounds very different from “altering sunrise and sunset times.” The former looks like a response mechanism to an external, natural, perennial stimulus, the latter like an artificial decision. However, both refer to the same practice. Because of that, the negative (and positive) effects usually associated with the artificial practice of seasonal clock changing must be associated with us adapting to two external stimuli:

the varying sunrise times beyond 30° latitude and the preset schedules that synchronize modern societies. Above all, this challenges the balance of pros and cons in the analysis by Neumann and von Blanckenburg (2025).

Seasonal clocks, by design, are synchronous with seasons. Therefore, it is complicated to differentiate seasonal effects from clock policy effects. At the end of their review, Neumann and von Blanckenburg (2025) address the positive economic effects “for the convenience retail sector” and add “[w]hether these results are actually due to the influence of DST is debatable, as seasonal effects can also contribute to this observation.” The thing to note is that the same remark can be made elsewhere in the review for many of the negative effects. For example, Neumann and von Blanckenburg (2025) note that “compared to standard time [winter time], sleep behavior also differs during DST [summer time]. This results in people getting around 20 min less sleep per day during DST [summer time].” However, this observation is only saying that people—meaning actually the German population that self-reported in Kantermann et al. (2007)—sleep less in summer than in winter—roughly 5% less—which does not seem illogical given the amount of daylight change: at 50° latitude, winter daylight and summer daylight differ by a factor of two. We are aware of the issues related to sleep deprivation. People in modern societies should globally sleep a bit more, both in winter and in summer. We are just noting that, beyond some circle of latitude, a sleep loss in summer, or a sleep gain in winter, does not seem artificial.

Inevitably, a review on the seasonal clock policy comes with an analysis of time zones and the misalignment between local time and sun time, which allegedly is exacerbated during the months of summer time. To show this misalignment, the third figure (Fig. 3) in Neumann and von Blanckenburg (2025) is borrowed from Roenneberg et al. (2019). Lobbyist associations, like the Time Use Initiative, also use this kind of figure to demand a strict adherence of time zones to the sun clock and cancel the seasonal policy (Time Use Initiative, 2022, Figure 1).

On the first hand, we must note again that the example of the Spanish National Assembly—where local time and sun time perfectly matched—shows that time zones are irrelevant in the issue of seasonal clock regulations. Time zones are only the modern, convenient way of designating local times from a global perspective. Individuals do not jump from one time zone to another at the spring or autumn transition. They just adapt their daily rhythm to the varying morning light they envision, thus keeping aligned with their sun clock (Martín-Olalla, 2022).

On the second hand, we must note that position in time zone—the misalignment of local time noon and the solar noon—is a nice explanatory variable as long as daily rhythms are uniform in the dataset, which is the underlying hypothesis in the third figure (Fig. 3) in Neumann and von Blanckenburg (2025). The

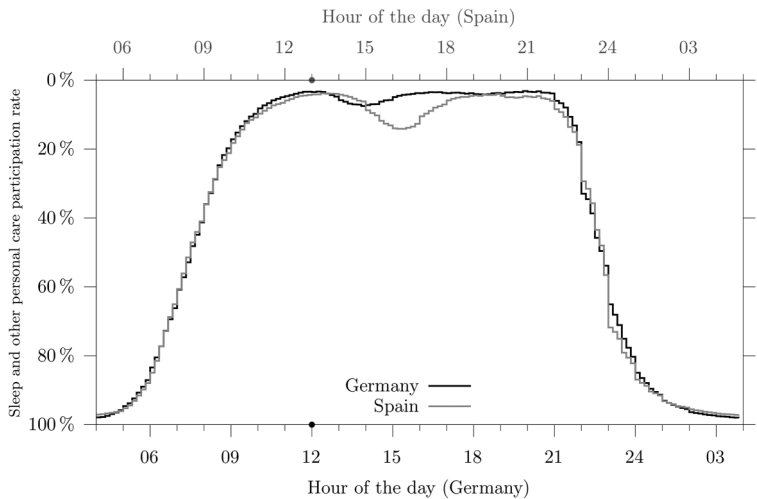


Figure 1. A comparison of the daily rhythm of sleep (wake) and other personal care in Germany (black) and Spain (gray). The Spanish daily rhythm is shifted by 1 h to account for the difference in longitude between the two countries. Spanish local time is read on the top horizontal axis; German local time is on the bottom horizontal axis. Black dots on either horizontal axis note local time of solar noon in either country. The plot shows that life in Spain and Germany is synchronized to the sun clock irrespective of the social clock. Data were extracted from the Harmonised European Time Use Survey (Eurostat, 2010).

hypothesis holds in a US time zone. Thus, studies of the kind are worth discussing (Gentry, 2023; Gentry et al., 2022; Martín-Olalla, 2023). Elsewhere, the hypothesis is very likely untrue (Martín-Olalla and Mira, 2025b). As an example, Germany and Spain (mainland) share the same time zone. They are separated by roughly 15° in longitude—or 1 h in Earth’s rotation—with Spain west (late) of Germany. This delay is seen in social metrics: Figure 1 shows that the Spain’s daily rhythm of sleep and other personal care delays 1 h from Germany’s daily rhythm. Thus, irrespective of clocks sharing the same time zone, while countries not sharing the same physical time zones, human daily rhythms can still be based on the position of the sun. In an extreme scenario, Sanford Fleming explained at the International Meridian Conference (New York Public Library, 1884) that should we operate with a uniform time zone worldwide, life on Earth would not be synchronous but would still follow Earth’s rotation and would still be adapted to sun position.¹

Seasonal clock changing addresses one sole question: which is the best hour to start the day in view of the varying sunrise times at extratropical latitudes (Martín-Olalla and Mira, 2025a). In many places, population agreed to a late

9 am to 5 pm winter working schedule, that turns into an early 8 am to 4 pm summer working schedule—nonetheless rendered as 9 am to 5 pm summer time—with more leisure time in daylight. Therefore, the question is not what time it will be but which preset time schedule it will be. Will we accept an early activity when the sun rises late? This plays against human physiology and was rejected in many occasions. Will we accept late activity when the sun rises early? This also plays against human physiology and was also often rejected. Will we agree that seasonal clock changing, while playing against human circadian rhythms at the transition dates, is a practical compromise that brings schedules not too early during the months of winter and not too late during the months of summer?

Data availability

Data are publicly available.

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ORCID iD

José María Martín-Olalla  <https://orcid.org/0000-0002-3750-9113>

Jorge Mira  <https://orcid.org/0000-0002-6024-6294>

Notes

1. All classes will soon learn to understand the hour of noon, whatever the number on the dial, whether 6, as in Scriptural times, or 12, or 18, or any other number. People will get up and retire to bed, begin and end work, take breakfast and dinner at the same periods of the day as at present, and our social habits and customs will remain without a change, depending, as now, on the daily returning phenomena of light and darkness.

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