

Matters of Sleep: Sleep Timing Devices Towards a "Sleep of Any Time"

Mewes, Julie Sascia

Veröffentlichungsversion / Published Version

Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

GESIS - Leibniz-Institut für Sozialwissenschaften

Empfohlene Zitierung / Suggested Citation:

Mewes, J. S. (2023). Matters of Sleep: Sleep Timing Devices Towards a "Sleep of Any Time". *Historical Social Research*, 48(2), 91-114. <https://doi.org/10.12759/hsr.48.2023.17>

Nutzungsbedingungen:

Dieser Text wird unter einer CC BY Lizenz (Namensnennung) zur Verfügung gestellt. Nähere Auskünfte zu den CC-Lizenzen finden Sie hier: <https://creativecommons.org/licenses/by/4.0/deed.de>

Terms of use:

This document is made available under a CC BY Licence (Attribution). For more information see: <https://creativecommons.org/licenses/by/4.0>

Matters of Sleep. Sleep Timing Devices Towards a “Sleep of Any Time”

Julie Sascia Mewes *

Abstract: »Gegenstand Schlaf – Zeitmessgeräte und tageszeitunabhängige Schlafpraktiken«. The article focuses on how sleeping as a daily practice is enacted through and besides “timing devices” for Northern Norwegian shift workers managing their sleep in the absence of common sleep-wake rhythms. Hospital staff working night and day shifts above the Arctic Circle are particularly challenged in managing their sleep-wake rhythms due to rotating working hours and contrasting seasons regarding extreme variations in light exposure. It is argued that uncommon sleep routines and subjective meanings of “good” sleep turn sleep from a merely unconscious mundane practice to an important “arena” of daily self-management. The article explores how timing sleep in daily life “comes to matter” within an interwoven network of social, material, environmental, and temporal arrangements. Methodically based on praxeographic participant observation and qualitative interviews with Nordic healthcare professionals, the article explores the socio-technological side of sleep (time). It discusses the notion of a “sleep of any time” building up on former notions of the “sleep of others” (Kroker 2007) and the “sleep of ourselves” (Williams et al. 2015) allowing further analysis of daily sleep timings (un)intentionally detached from common imaginings of “normal” or “natural” sleep-wake rhythms.

Keywords: sleeping as practice, sleep-wake rhythm, shift work, sleep timing devices, praxeography, science and technology studies, time studies, Arctic Norway.

1. Introduction

Britt¹ mentions that she has heard others [with residence in Arctic Norway] saying sleep issues were something only non-locals had. Living “up North,” one is inevitably accustomed to “learning by doing” since one had to sleep sometime. “If you have to

* Julie Sascia Mewes, University Bochum, Faculty of Social Science, Chair of Cultural Psychology and Anthropology of Knowledge, Centre for Anthropological Knowledge in Scientific and Technological Cultures, Building GD E1.249 Box 80, Universitätsstr. 150, 44801 Bochum, Germany; Julie.mewes@posteo.de.

¹ All interlocutors’ names and other personal information allowing the individuals to be directly identified have been pseudonymised.

work [during the polar nights], it doesn't make a difference. You go to work by night and you come home by night." [...]

"Orienting yourself to light that just doesn't work. I don't think it's innate that they [the locals] don't do that. I think it's a habit.

But to rely on the circadian rhythm that works in September and March. [...] Maybe up to August and October. And maybe a little longer; until February and April. It's guaranteed not to work during the other months."

(Britt, interview I, January 2020, translated by author)

Apart from the specific demands of working rotating shifts, medical doctors, such as Britt, and nurses are among the professionals above the Arctic Circle who are challenged by two contrasting seasons regarding extreme variations in light and darkness. Northern Norway, the most populated Arctic region, might be the most ideal place for studying the seasonal influence of (natural) light on sleep and sleep devices used to deal with daylight changes during the course of the year.

The article departs from my project "*Matters of Sleep – Sleep devices in the everyday life of Norwegian hospital staff*"² researching sleep as a daily social practice and sleep timing devices as novel approaches to its "management" (Mewes 2021, 2023).

It operates on the intersection of science and technology studies, health studies, and the social study of time and aims to advance the knowledge of how sleep timing devices support and/or prevent sleep under uncommon work conditions and/or seasonal variations. Thereby, it aspires to develop a deeper understanding of the in-situ socio-technical and time-making day-to-day practices surrounding sleep and the revolving subjective reason-making of actors working shifts in Arctic Norway and elsewhere.

Sleep itself is understood as a significant example of the intermingled forces and effects of social, socio-technical, and biological formations. Hence, *sleeping* is theorized as a temporally, spatially, contextually-bounded, and embodied practice. Mundane technologies enacting specific daily sleep-wake rhythms and routines are described by introducing the notion of *sleep timing devices*, which will be further elaborated upon in the section on sleep devices as a research concern. It is argued that new knowledge regarding sleep is gained through devising sleep timings, thereby challenging common understandings of sleep from a non-conditional or "natural" mundane routine.

In the introductory vignette, Britt, whom I first met during the polar nights of 2019/2020, tells a story about living and sleeping in Arctic Norway. About

² The research project was funded by the German Academic Exchange Service (DAAD) through a postdoctoral mobility experience fellowship (P.R.I.M.E.) granted to the author from December 2019 until July 2021 including a one-year research stay at the University of Oslo during which the ethnographic field work was conducted in the Norwegian region of Troms og Finnmark in December 2019-January 2020 and June-July 2020.

alternative habits of telling, experiencing, and orienting oneself in and through time due to the absence of the *Zeitgeber*³ light within the day-night rhythm during the polar summer and winter lasting roughly a third of the year. Departing from Britt's account, a variety of questions regarding Arctic shift workers' strategies to find "good sleep" in this absence and the socio-technological embeddedness of "timing sleep" as a specific way of reckoning and managing (sleep) time unfolding.

In the following, the article shortly introduces specifics of "Sleep-wake rhythms in the Arctic" and "Sleep-wake rhythms of shift workers" as the two most pressing concerns reported by my interlocutors working shifts in a hospital located in Troms og Finnmark before proceeding with a focused current research state regarding "Sleeping as a research concern."

2. Sleep-Wake Rhythms in the Arctic

Above the Arctic Circle, the sun is above the horizon all day in summer and below the horizon all day in winter, summing up to about four months annually of either eternal natural light exposure during "Midnight Sun" or eternal darkness during "Polar Night." Problems with sleep, mood, and energy related to seasonal light exposure were suggested to be bigger in the High North since suboptimal light conditions were deleterious to health (Arendt 2012; Hansen, Lund, and Smith-Sivertsen 1998; Johnsen, Wynn, and Bratlid 2012; Sivertsen et al. 2021).

It was hypothesized that darkness during the day and illumination during the night may contribute to insomnia (Pallesen et al. 2001). However, a recent study based on data from the "Tromsø Study," a large representative health survey conducted between 2015 and 2016, indicates otherwise. It concluded only "small or non-existing seasonal variation in sleep and sleep difficulties" naming a "considerable level of artificial light" in Tromsø, the regional capital of the most northern region of Norway's mainland Troms og Finnmark, as possibly contributing to rather stable sleep patterns throughout seasonal variations (Sivertsen et al. 2021).

Of all circadian *Zeitgeber*, the light-dark cycle is considered to be the most important factor for circadian timing (Arendt 2012; Meyer et al. 2022). Daylight is seen as the dominant environmental *Zeitgeber* or circadian cue influencing the timing of sleep and has been outlined as a primary cause of potential "circadian misalignment" or "chronodisruption" (Vetter 2018 as cited in Williams et al. 2021: 8). Sleep disorders concerning light(ing) are thought to be connected to demanding work environments, 24-hour

³ *Zeitgeber*: "Time giver," a term to describe environmental (and in extension also social) cues such as sunlight light accustoming an organism to a certain sleep-wake cycle.

illumination, and constant urban alertness (Coveney 2014) or sleep disturbance caused by electric light in general (Skeldon, Phillips, and Dijk 2017), and particularly the artificial light of technological devices such as smartphones and laptops (Christensen et al. 2016). Hence this article focuses on sleeping and sleep timing devices of Arctic shift working hospital staff revolving around light(ing).

3. Sleep-Wake Rhythms of Shift Workers

Shift work is defined as a means of increasing productivity and is increasingly common in industries such as agriculture, telecommunications, printing, health, broadcasting, food production, and transport. Between 10 and 30 per cent of the workforce in high-income societies such as Norway work in shifts, and sectors requiring 24-hour services such as healthcare could not operate without shift work (Boivin and Boudreau 2014; Matheson, O'Brien and Reid 2014).

Due to the specific work conditions (three-shift rotation including day, evening and night shifts, on-call-duty, quick work returns, etc.), hospital staff belongs to a high-risk group prone to numerous health problems, among which are psychiatric, gastrointestinal, and cardiovascular diseases as much as sleep disorders caused by temporary or permanent sleep-circadian misalignment (Boivin and Boudreau 2014; Härmä 2013; Härmä, Gustavsson, and Kolstad 2018; Härmä and Kecklund 2010; Meyer et al. 2022). Studies have shown that over 30 per cent of professionals working night shifts are affected by sleep disorders or sleep deprivation as opposed to 18 per cent of the general population (Mansukhani et al. 2012)

Indeed, sleep disorders are so common among shift workers that “shift work sleep disorder” was suggested as a medical diagnosis with about 27 per cent of shift workers meeting its formal criteria (Pallesen et al. 2021).

Numerous new “disorders” related to the circadian rhythm or sleep-wake cycle have been introduced in the last decades, pointing towards what Williams and colleagues described as the “merits of naming” but, more importantly, the question of “what normal sleep is in the first place, for whom, when and where” (Williams, Meadows, and Coveney 2021, 9). The lack of regular sleep time routines presumably required for “normal sleep” therefore might result in health risks but also social stigmatization. The management of sleep time routines to prevent stigma by obeying a “normal” mode of sleep is increasingly challenging. It has been argued that this mode is increasingly “ill-suited” to the sleep timings of the global workforce (Birth 2007; Reiss 2017, 185-90).

Besides the risk of treating complex problems embedded in social contexts with oversimplified solutions, research has shown over and over that the

circadian system and associated physiological rhythms do not seem to readily adapt to the displacement of sleep-wake-times and associated temporal distortion of light and dark exposure and/or food intake. This results in shift work being suggested to have a “substantial effect at the population level” (Ganesan et al. 2019; Meyer et al. 2022, 8). This effect was underlined by a recent study among hospital nurses working in Norway mentioning sleep problems as one of the most common reasons for work-related sick leave incidents (Ose et al. 2022).

Adverse health consequences, motor vehicle accidents, increased alcohol and medication use, the occurrence of serious medical errors, and an increased risk of other workplace accidents are associated with both sleep deprivation and shift work (Mansukhani et al. 2012; Meyer et al. 2022; Wagstaff and Lie 2011). The professionals’ patient care responsibilities require a high level of vigilance and sleep disorders or deprivation cause potentially adverse implications for patient care. Getting as much good quality sleep as possible is imperative to providing excellent quality care (Matheson, O’Brien, and Reid 2014). Reported coping strategies or “chronotherapies” include interventions such as short naps and the consumption of caffeine during working hours and the avoidance of direct sunlight exposure or bright light treatment as well as sedatives (such as melatonin) to fall asleep after night shifts or so-called “uppers” (drugs promoting wakefulness) to ensure productivity during the next shift (Mansukhani et al. 2012; Williams, Meadows, and Coveney 2021, 14-5).

Medical and Health Studies’ shift work research has mainly focused on the physiological and psychosocial health and sleep effects rather than the individual experiences and specific day-to-day strategies of shift working health care professionals and the use of sleep devices thereby (Matheson, O’Brien, and Reid 2014). It, therefore, remains a challenge to identify the “timing of sleep in the real world” based on the constant interaction of the circadian system with social schedules, environmental schedules in the sense of light-dark exposure, but also genetic factors, sex, or age (Meyer et al. 2022, 1-2). Awareness of the mechanisms behind shift work-related sleep problems in the specific local environmental circumstances of the Arctic hence have been argued to be essential regarding shift work scheduling as well as clinical treatment of both patients and professionals (Saksvik et al. 2011; Flo et al. 2012). However, only a few studies have engaged with sleep-timing-related aspects of shiftwork in polar regions, both Antarctic and Arctic, under real working and living conditions (for the Antarctic, cf. Arendt 2010, 2012; Sletten et al. 2022).

In the following, the article is divided into five sections: First, the current research state regarding “Sleeping as a research concern” is presented. Secondly, it is followed by a section on “Sleep devices as a research concern” in the broader social science discourse with a focus on Science and

Technology Studies (STS). The third section on “Methods” briefly introduces praxeographic sleep research and discusses the methodical approach for the study of intimate and highly tacit daily routines. The fourth section is dedicated to the project’s empirics about “How sleep comes to matter (or not)” and brings the reader back to Arctic Norway presenting two different modes of ordering daily doings related to “timing sleep through devices.” The subsequent “Discussion” builds upon these empirics and works out possible further implications for STS sleep research followed by a “Conclusion.”

4. Social Studies of Sleeping

Though sleep medicine and related physiological and biological fields are well-established, high-impact fields, surprisingly little research about sleeping as a daily practice and its devices-in-use have been conducted within the social sciences and humanities. Apart from anthropological research on sleep cultures (e.g., Barrett and McNamara 2012; Glaskin and Chenhall 2013), studies focused for example on pre-modern sleep, the changes in sleep during industrialization, its medicalization and politics in the 20th and 21st century, and the social acceleration related to it (Hsu 2014; Kroker 2007; Reiss 2017; Williams 2005, 2011; Williams, Coveney, and Gabe 2013; Williams, Meadows, and Coveney 2021; Williams and Crossley 2008; Williams and Wolf-Meyer 2013).

Within the field of Science and Technology Studies, research has related to sleep by exploring the role of medical knowledge and expertise in mediating the relationship between sleep and health (Moreira 2006), non-human sleep (Hsu 2015), sleep medicalisation in the light of neoliberalism (Wolf-Meyer 2012), or the role of chronobiology as a scientific field in society today (Williams, Meadows, and Coveney 2021). In sum, compared to the vital role of sleep it has been given relatively little attention by the social sciences and humanities (cf. Williams and Wolf-Meyer 2013). It was argued that “the multi-disciplinary nature of sleep and its study” was often overlooked by high-impact fields of sleep research impeding interdisciplinary research and the broader acknowledgement of the importance of the inclusion of perspectives on sleep as a concern relevant *to* and *in* the past as much as present societies (Williams 2005).

Besides this, sleep long has been dismissed as a “‘non-social’ event or experience and an (involuntary) form of ‘in-action’” by the social sciences and humanities (cf. Taylor 1993; as cited in Williams 2005, 3). A team of renowned researchers in the social study of sleep recently renewed their call for more “theoretically-informed empirical research” concerning the social aspects of sleep both in science studies and studies on how scientific findings are

translated into public discourse and daily knowledge practices (Williams, Meadows, and Coveney 2021, 1514).

Researching “sleep as a practice” in daily life could serve as an impetus to overcome prevalent simplifying conceptualisations of sleep as a body function (cf. Meadows 2016, 1095). The article is an attempt to broaden the scope towards an understanding of sleeping as a daily practice, ordered by norms and values and enacted with and through socio-technological arrangements in time.

5. Sleep Devices as a Research Concern

Sleeping, as every daily practice, comes to matter within and through an interwoven network of social, material, and temporal arrangements (Mewes 2019). These arrangements are crucial for the ability to sleep. The more disturbing its conditions are, the more efforts are invested into creating “sleepability.” Sleeping (and particularly its timing) is arranged *through devices*. From clocks and watches to beddings and mattresses; from sleepiness-detection and other tracking devices to white noise machines and sleep medication – sleep is increasingly understood as a practice to be regulated and tracked with the help of technology and medicine (Ashmore 2011; Crook 2008; van der Geest and Mommersteeg 2006; Krafl and Horton 2008; Pallesen et al. 2001; for an overview of the Anglo-American history of sleeping aids, cf. Reiss 2017, 185-206; Van Dongen 2007).

Reported sleep devices within the group of shift workers in the health care sector included “bright light therapy,” wearing sunglasses during the early morning commute home after a night shift, sleeping in darker rooms, or avoiding (direct) sunlight exposure in other ways (Dumont, Benhaberou-Brun, and Paquet 2001; Pallesen et al. 2001; Pallesen et al. 2010).

However, studies concerning sleep devices were mostly conducted in simulated situations or through modelling approaches only (Pallesen et al. 2001; Skeldon, Phillips, and Dijk 2017; Williams, Coveney, and Meadows 2015). Research on the assumed relationship between devices and sleep with information and communication technology (and particularly their bright screens) stresses its dual influence on sleep as simultaneously harmful and beneficial. Whilst mobile phones or laptops were criticized to be harmful to the “nature” of sleep, the very same bright screen might be regarded as an aid of sleep optimization when used as a tracking device or providing advice and information (Mulvin 2018; Reiss 2017, 190-1; Williams, Coveney, and Meadows 2015).

Everyday sleep-wake-cycles unfold through *sleep devices*; but also, *in time*. The notion of *sleep timing devices* describes and makes analysable (non) digital

tools and infrastructures which measure, track, synchronize, or account for sleep-wake-cycles in the broadest sense.⁴

It includes individual measures such as alarm clocks, sleep trackers, and sleep medication, or means to avoid direct (sun)light exposure or lighting.

The relationship between (novel) technology and shifting time practices and experiences of temporality in society has been subject to study for a couple of decades (cf. Wajcman 2008, 59).

The social impact of light, illumination, luminosity, and its temporal and timing aspects was subject to recent research in anthropology and material culture studies (Bille and Sørensen 2007) or environmental sciences (Ebbensgaard and Edensor 2021).

However, as Wajcman points out, many social theorists perceive technology as the main force of speeding the pace of life but have yet to develop an interest in technology in everyday life. The makings and doings of “logistical media,” such as calendars and clocks, driving the “mediatization of time” have only begun to draw attention in fields such as the social studies of technology or media studies (cf. Wajcman 2019, 317).

The accelerated speed of technological innovation results in increasingly complex and tacit ways daily life is micro-coordinated, also with and through (sleep) timing devices, making this research gap particularly noteworthy (Wajcman 2019). This also stresses the relevance of studying mundane sleep timing devices in the tradition of materialist and post-humanist-centred research approaches in STS by introducing timing devices as relevant “matters of care” in the sense of being attentive toward formerly neglected socio-technical arrangements vital to the production of knowledge in mundane life and performance of daily life as such (Puig de la Bellacasa 2011, 2017). The following section will briefly introduce the applied methods to study the doings and matters of sleeping and the highly implicit and tacit daily routines related to it.

6. Methods

Although there has been extensive research on sleep and shift work as such, no empirical praxeographic – a practice-centred ethnographic research approach – sleep research concerning the group of shift workers has been published in an English- or German-speaking venue to the author’s knowledge so far. Thus, the study was conceptualized as a praxeographic exploration based on participant observation and 12 qualitative interviews

⁴ Barbara Adam has coined the term “timescape”; a compound including time (generic term and duration) temporalities (processual time), tempo (speed), time modalities (past/present/future), and timings. Timing, used as a verb or adjective alike, is understood as the “synchronisation between, processes, actions, events, groups of people” (Adam 2021, xix).

with nurses and medical doctors (MDs) adapting Nicolini's interview method "interview to the double" to capture the discursive and moral environment within which sleeping practices and the use of sleep timing devices unfold as a "matter of care" for STS researchers and beyond (Marres 2012, 2017; Mewes 2019; Mewes and Sørensen 2017; Mol 2002; Nicolini 2009; Puig de la Bellacasa 2011).

I conducted one interview during the polar night season and the midnight sun season with each of the interlocutors to cover individual differences during the course of the polar year. The interviews took about two to two and a half hours each and were conducted in their respective private housing to capture the practices of sleep preparation *in situ*. The interviews were conducted in English or German and some sprinkled-in Norwegian, recorded, fully transcribed, translated into English where necessary, and coded (Flick 2018). The empirical data of the project consist of about 26 hours of audio recordings and extensive field notes. The specific focus on how sleep comes to matter for the interlocutors during their daily routines allowed joint reflection concerning commonly tacit and implicit daily routines of enabling sleep through timing devices-in-use. This focus served as an impetus for turning the implicit explicit.

Methodically, Nicolini's "interview to the double" was adapted through a careful and "methodographically" reflexive combination of research techniques in STS ethnography focusing on daily micro-routines as much as the devices-in-use revolving sleeping as practice (Lippert and Mewes 2021a, 2021b; Mewes and Lippert 2023; Mol 2002). We wandered through their respective homes enacting their daily routines as precisely and detail-oriented as possible, as if they were instructing me to act as their "double," including the embodied practices and handlings of their devices in use. Data sets, audio recordings, and my field notes were then layered in the paper's resulting "praxeographic accounts."

In this article, I will introduce two praxeographic accounts concerning Anne's and Britt's mundane sleep timings through devices. These data were selected to underline the high contrast and variety of sleeping in the daily life of Arctic hospital staff working shifts and to set the basis for their contrasting as an analytic technique (Laurent et al. 2021).

7. How Sleep Comes (Not) to Matter

Anne is in her twenties and works rotating shifts as a nurse in a hospital in Northern Norway. When we first met in January 2020, she reported serious sleeping issues and feelings of constant exhaustion. At the moment, she barely slept more than two hours in one bout, often lying in bed and playing on her phone or just waiting to fall asleep again. She regularly wouldn't sleep more than six hours a night.

Asked how Anne would describe her sleep, she answers: “Pretty badly I think, because, maybe, to have some sort of sleep hygiene is to have some sort of control, I guess. [...] When I work three-part shifts there is not any continuity in it and it changes all the time and my brain and body just cannot deal with it.” Her sleep wouldn’t be good either way but was worse when working shifts.

Sleep issues ran in the family but both shift work and moving above the polar circle a couple of years ago from her hometown in the South of the country made it more difficult for her to rest. The long winters up North lowered her quality of life significantly. Anne hated the snow keeping her inside during winter most of the time. She adds jokingly that she might be the only Norwegian who did not ski or practice other winter sports. The snow didn’t do anything but bother her.

The missing daylight was the most pressing issue during winter. She “fools her brain,” as she calls it, by putting on artificial lights during her wakening hours but as few lights on as possible before going to bed.

Next to her bed is a shelf with three or four sleeping masks and handkerchiefs on it. After spending the evening in front of the TV, she would start dimming the lights in her apartment one by one on her way to the bedroom. [...]

She would lie down, set the alarm and continue to play a quest game on her phone until she felt tired “enough.” She says this while gazing at the respective objects. Then she’d switch off the last light, put down her phone on the mattress next to her and put on her sleeping mask. Switching off the lights one by one before going to bed and the soothing effect the gentle pressure the sleeping mask had on her eyes meant saying to herself “Okay, now we are tired” she adds later.

During our meeting in July, Anne tells me her sleep quality had increased significantly since our last meeting. She felt like she might have finally become accustomed to the local seasonal changes or had found her ways to deal with them.

The constant light was the most pressing issue during the midnight sun season. The blinds and thick pull-down curtains helped her to set the “right time” of day for herself. Two other issues were that her apartment heated up quickly but opening the windows meant there was no way anymore to shut out the shrill noises of the seagulls’ colony breeding at a close distance to her apartment. The seagulls’ screams did not seem to stop once they started, regardless of what time of the day it was.

During summer, Anne usually spends more time outside, meeting friends to take evening walks or sitting outside and enjoying the sun at whatever hour pleased her. Since she was working all summer, things were different this year. A short glimpse at the sky when walking 400 meters home from the bus station after her shift usually is the only time of the day she gets to acknowledge the midnight sun. “It is beautiful. But now I just work, so, it’s the same for me” she says laughingly.

Anne thinks she'd maybe have "more energy and better sleep" if she had "more regularity in everyday life" and talks about how both bettered when not working shifts during vacation. When I asked her whether she considered quitting to work rotating shifts altogether, Anne replied:

"I think I would be better off if I just worked the day shift. But then I'd lose my salary, plus I also like working evening shifts, because it's usually calmer and it's a different mood at work. But my body probably would be better off if I just work[ed during the] day, because maybe then I would sleep." She had to try and find a balance between these two needs.

Asked about her plans, Anne tells me about being "tired" of the polar winter, the darkness, and the snow and she wishes to move back to her home town about 2,000 km down South.

(praxeographic account based on two practice-oriented interviews and praxeographic notes with Anne in January and July 2020)

Describing her "sleep hygiene," Anne talks about her brain and body longing for sleep as being put in a state of constant time distortion due to the absence of the seasonal variation of sunlight exposure or lack thereof during the polar night and midnight sun periods, and the lack of "any rhythm" due to her ever-changing shift schedule.

She accounts for her difficult relationship with the Arctic winter, something she felt like she was failing to become accustomed to even with her already having been in residence for the last couple of years. The amount of snow and ice and, most importantly, the darkness during the winter bothered her significantly. Though her accounted relationship with her town changed considerably during the summer, she contemplates moving back to a Norwegian region south of the polar circle with less extreme seasonal variations.

Working within the three-shift rotation system provided her with more variety in her daily work tasks and the higher salary for working nights was another positive aspect. However, Anne felt like she constantly had to find "a balance" between her profession and her health, implying working shifts were potentially harmful to the latter. She concludes on the long term her "body would be better off" working day shifts only.⁵

Anne mentions a variety of devices that mattered in her strategies to find sleep. The heat and the noises of seagulls lasting 24 hours a (midsummer) day outside of her apartment are intrusions she tried to block out as much as possible when it was time for her to sleep.

⁵ This additional temporal aspect of shift work as a work timing format was a reoccurring concern brought up by the majority of interlocutors. To all of them who were below the age of 30, the three-shift system was a desirable working mode while being young, while saving up money (often for an apartment or house), while being single or before starting a family. The interlocutors in their 40s and 50s instead all had found work time scheduling agreements with their respective employees without changing shifts, i.e., either working day shifts or night shifts or on-call shifts only.

Most remarkably, however, was her description of how she dealt with the absence or constant (clouded to sunny) presence of natural light during a good part of the winter and summer seasons respectively. Talking about her routines in preparation to fall asleep, she mentions the thick curtains blocking out daylight and the artificial lighting she routinely dimmed and switched off one by one; the alarms set on her phone as well as the games she had on it to play; and the sleeping mask she used to soothe her body to fall asleep. Her mobile phone functions as a constant time-telling device, time distracting game device, and interlocutor to keep in touch with her friends and family, she always kept it close to herself during her free time.

Besides that, sleep timing devices concerning light were central in Anne's daily routines in search of finding (time for) sleep within her constantly changing sleep-wake-rhythms. Light-related sleep timing devices allowed her to re-create an artificial day-night rhythm in her apartment which suited her temporal rhythm not provided by her working conditions and surrounding environment. The discussion will further detail if these sleep timing devices can be read as enabling a "sleep of any time" uncoupled from common sleep-wake rhythms bound to day and night. First, the next section deals with Britt's sleep management the reader was introduced to in the article's introductory vignette. What follows is a praxeographic account about how finding time for sleep does not matter to all Arctic shift workers:

Britt is a surgeon working on-call shifts lasting 24 hours to 48 hours in a hospital in Northern Norway. Her shift usually lasts from eight a.m. to six p.m. On average, every fifth shift she won't leave the hospital before midnight or be called back to the hospital at any time since she had to urgently operate on a severe injury or infection.

Britt describes her sleep as generally good but too short. She wouldn't sleep as little if she weren't working on-call shifts but probably would sleep too little anyways. Shift work functioned as a temporal "flexibility training," she simply lay down before her body "went on strike." If she had to, she also could rely on a form of self-taught hypnosis, making her fall asleep in minutes though the sleep quality tended to be low when she forced her body to sleep. To wake up, both a traditional alarm clock and another alarm on her phone were set on the highest volume possible half an hour before she had to leave for work. Her phone was always set to the highest volume so she wouldn't miss any calls from the hospital. Sometimes, when her cat did not want her to leave the bed and climbed up her body as soon as the alarm went off, she had to hurry to make up the time to convince her to get off her to be able to get up first. A part of her living room is filled with different plants. For their survival, during winter she has bought "natural light bulbs" in the local handy store. She put on the lights for a couple of hours during the 24 hours of the day. The plants did not care if it was day or night, she adds. When I asked her to tell me about the local "light infrastructures" provided by the municipality, she mentions the 24-hour illumination of a nearby skiing slope and the municipality's focus to illuminate

comparatively densely populated areas and main streets. The street to her rather remotely located house remained dark.

When doing surgery, time passed without her noticing. All focus was on the patient, her tiredness would not matter due to the adrenaline rush. During her organizing duties as a team leader, she felt tired more often, since it's "not only require[d] manual work."

I mention that sleep medicine and advice more or less based on chronobiology often suggested stable sleeping hours aligning to the circadian rhythm. And how I wondered if this recommendation might be of little to no use for people living in this region and shift workers in general. She nods and remarks simply that "regular meal times are recommended too, but medical doctors don't do that either."

Britt's sleep rhythm is mainly organized around (or despite) her work and the different tasks on her to-do list throughout the changing seasons. Asked for an example of these tasks, Britt talks about how she sometimes had to shovel snow preventing the car she uses to commute to work from getting entirely stuck during winter.

She also describes how summer kept her busy: "Whether you push snow until three in the morning because otherwise you won't be able to finish, or whether you don't even think about going to bed until two in the morning because the weather is so nice. You don't sleep."

"The summer here, you have already seen it, is a bit special. And it's even more special when you've had such a long winter behind you. And summer is awesome and it's way too short and everyone knows that. At the same time, of course, you pretend it is forever because you enjoy it. So, you don't look at the clock or anything. And you want to do everything, preferably at the same time. [...] Because summer light also makes you high and it also makes you awake due to the whole melatonin balance and everything. And from there you ignore it [the feeling of being tired] and you don't feel that way. If you objectify that, [...] you sleep an hour less during the summer or something. Probably. I do not know. I don't look at the clock."

Since the weather was very changeable in the region, she adds: "You live from day to day and everything else just doesn't matter. Because, phew, you can sleep when it rains."

(praxeographic account based on two practice-oriented interviews and praxeographic notes with Britt 01 and 07/2020)

Britt does not prioritize sleep in her life, to her it was something one was left to do when it rained and she could not pursue her activities or her body forced her to rest. The encounters with her and the resulting data puzzled me at first. The account significantly differed from the often-described longings for "normal" sleep rhythms and the other interlocutors' sleep management efforts, including Anne.

Instead, Britt talks about caring about being a good doctor, performing potentially lifesaving surgery, and managing her team. Sleepiness during surgery was not an issue since it was "manual work" and the accompanying

adrenaline rush was due to the urgency of the procedure. Britt also cares about keeping her cat happy; maintaining her house, garden, and sailing boat; and playing the harp. What was important to her, important enough to tell me about, was what *she did while not sleeping*. And how working shifts was a “flexibility training” in what I understand as the avoidance of spending time in her busy day on sleep as such and even more so as following the convention related to sleeping within a normatively, rather than “naturally,” given rhythm. Only when her “body went on strike” or she anticipated that she required sleep to be rested for the upcoming day, is sleep an issue to be solved, e.g., through meditating herself into sleep.

Sleep rhythms were as irrelevant to her daily life as regular meals, both medical advice commonly not followed by medical doctors. She was not dealing with sleep issues due to the extreme working and environmental conditions. Locals of the polar region would become accustomed habitually, with time and through practice. She rejected the idea of sleeping in the Arctic as innate expertise; an explanation several residents have given me during shorter or longer informal chats in buses and aeroplanes, stores, or restaurants during my research stays.

Mentioning the potential influence of sleep timing devices, she first could not think of another device important to the maintenance of her sleep-wake-cycle. However, shovelling snow to keep her car from getting stuck during the polar nights became essential.

Britt’s sleep timing devices might be searched for outside (of her bedroom): Snow shovels, natural light bulbs for her plants in the living room and greenhouse, paint for her sailing boat to be applied with sufficient time of sun to dry afterwards, her harp waiting for her to be played, her cat to be fed and cared for – and last but not least – the scalpel in her hand provoking total focus on the patient’s body on her operating table. Most of these devices are highly dependent on seasonal changes or the highly changeable Arctic weather fluctuating from day to day, sometimes from hour to hour. Other devices were important in her daily life function as timing devices requiring regular practice or attention as the art of playing a musical instrument or performing high-precision surgery or her caring responsibilities for her pet.

The account points towards Britt’s rejection of (non-local) medical sleep advice. Her sleep timing devices were mainly used as tools to push sleep to hours during which work and leisure activities were impossible. The alarm clock and her phone during on-call shifts limit her sleep duration to the minimum. These rather classic sleep timing devices seemed to mainly align her daily life to the hospital’s schedules, e.g., the scheduling of surgeries of incoming emergency patients or the working hours in ambulant care during the daytime.

Light as relevant to Britt’s sleep timings is mentioned twice: The midnight sun caused her melatonin levels to rise and what she describes as a “high” is

letting her temporarily forget about sleep. Also, she underlines the seasonal local uselessness of light as a natural *Zeitgeber*. During the polar nights, her living room plants were kept alive with “natural light.” Although these lights were switched on at a time of the day suiting Britt’s schedule and not necessarily while she was at home, they point towards a similar re-creation of the day-night-cycle as in her colleague Anne’s daily life, perhaps here to be understood as a sort of flexible sleep timing device of the non-human. But, most important to Britt is that “you can sleep when it rains” during the short and intense polar summers and snow-lighter hours or days during winter. As she mentions, to her the orientation of one’s sleep cycle to natural sunlight was not working in the Arctic during a good part of the year.

The municipality’s “light infrastructure” focused on location rather than time, on lighting a ski slope as a leisure activity to enjoy or securing street lights to the main roads *at any time* rather than providing residents with artificial light *Zeitgeber* to proceed in their daily doings during polar nights. In conclusion, Britt times her sleep through sleep timing devices mainly serving the purpose of limiting its duration rather than creating “sleepability.”

The empirics for this article deriving from encounters with Anne and Britt demonstrate opposing strategies in terms of daily sleep management. The following discussion outlines how, despite opposing modes of ordering sleep and resulting daily sleep practices, there remains a shared objective of managing sleep-wake-rhythms despite its constant re-scheduling. This objective is described with the notion of a “sleep of any time” building up on formerly introduced notions “sleep of others” (Kroker 2007) and “sleep of ourselves” (Williams, Coveney, and Meadows 2015) in the social study of sleep.

8. Discussion

The following discussion starts with an outline of the notions “sleep of others” (Kroker 2007) and “sleep of ourselves” (Williams, Coveney, and Meadows 2015) to then introduce and elaborate on the notion “sleep of any time.” The notion is meant to set the ground for relating bodies of literature in the social study of sleep focusing on social expectations about sleep-wake rhythms during the 24-hour day and STS time studies studying sleep as a time-sensitive daily practice enacted through devices.

8.1 From the “Sleep of Others” to the “Sleep of Ourselves”

During the 20th century, sleep has become an object of scientific investigation in the then-novel domain of sleep medicine. Sleep, originally a rather personal experience, was increasingly seen through the eyes of others

or through technologies that monitor and measure it, provoking historian of science Kenton Kroker to state that sleep was turned from something inherently individual and private into the “*sleep of others*” (2007).

In response to Kroker, sociologists of science and technology Simon Williams, Catherine Coveney, and Robert Meadows have argued that the rise of easily accessible sleep tracking devices for individual use monitoring and managing sleep in the digital age has led to a recent shift in sleep management towards the individualization of measures. Sleep was increasingly considered as something to be digitally tracked and traced in the name of self-optimisation shifting the responsibility in search of “good” sleep back towards the individual users coined as the “*sleep of ourselves*” (Williams, Coveney, and Meadows 2015). The same team of authors proceeded, arguing that promoting self-optimisation through “hacking’ our body clocks and circadian rhythms” and related promises of life improvement from the field of chronobiology, and presumably other chrono-sciences too, might be predominantly driven by “neoliberal mandates and motifs” or even a “form of chronobiocapitalism” (Williams, Meadows, and Coveney 2021, 20).

The “improvement” or “optimization” of sleep meant to increase individual performance, efficiency, and productivity. It often results in limiting and timing its duration to certain hours of the day. Despite variations based on age, gender, health, and other factors, there is a more or less agreed-upon standard in sleep research concerning sleep timings. A joint statement by the “American Academy of Sleep Medicine and Sleep Research Society” illustrates this and recommends that healthy “[a]dults should sleep 7 or more hours per night on a regular basis to promote optimal health” (Watson et al. 2015). According to this standard, acceptable sleeping hours are pushed to the night and are expected to last seven or more hours without interruption. In popularised versions such as popular science books or other media outlets, this standard is intertwined with unachievable and misleading concepts of the advantages to time sleep within a “natural,” “normal,” or “given” day-night rhythm or equated with the rediscovery of “ancient” body clocks based on narratives of seemingly less sleep-troubled, “nature-bound,” pre-industrial, or pre-modern ways of living (cf. Williams, Meadows, and Coveney 2021, 22; Reiss 2017, 200).

These outlets often seem to be based on oversimplified, generalised, and seemingly “universal” sleep models more or less loosely based on chronobiological and other sleep research findings. They seem to be predominantly written for a middle-and upper-class, body-abled audience residing in time zones of the Global North able and willing to afford stable sleeping hours. In addition, these hours tend to align to the day-night rhythm within “time zones where the most economically advantaged people live” (Birth 2007; Reiss 2017, 191). As a counter-example and refreshing intervention in the genre oscillating between self-help and popular science,

the recently published “Rest is Resistance” defines sleep and rest as a liberation practice against the systemic oppression of (sleep-) marginalized groups (Hersey 2022).

Knowledge concerning “normal” or “natural” sleep does not systematically consider sleep timings at the social or geographic margins, e.g., the polar regions. This provokes the question of how sleeping hours are managed in a seemingly timeless or permanently time-distorted (work) environment when sleep cannot follow norms concerning a good night’s rest or health advice calling for stable rhythms but simply needs to happen “at any time.”

8.2 Modes of Ordering and Devising Sleep Towards a “Sleep of Any Time”

In practice, daily (polar) sleep of shift working personnel is cognitively “ordered” based on bodily experiences and subjective meanings of time, self, and sleep as much as influenced by socio-normative expectations and taken-for-granted knowledge concerning “how-to-sleep.” Simultaneously these “*modes of ordering*” concerning “good” or “normal” sleep timings serve as a trajectory to daily routinisation while remaining flexible to spontaneous changes when needed (Moser 2005; Mewes and von Peter 2013).

The first mode of ordering in the empirical data strongly aligns with socio-normative assumptions on what “normal” sleep is or should be, resulting in daily attempts to re-create the temporally absent *Zeitgeber* light through artificial lighting when and where external factors such as Anne’s working hours allow it. Sleep timing devices prevent light to enter her apartment or imitate a day-night-cycle with artificial lighting spread across the apartment and dimmed down when “it was time” to sleep. Note, the time of day of sleep preparation has to remain flexible due to her working within rotating day, evening, and night shifts. Devising sleep through light substitutes for the temporal absence of environmental time cues and the additional need to sleep within ever-shifting temporal rhythms. This results in a highly individualised time rhythm. Sleep is enabled through locking out environmental time cues or disruptions of the surrounding environment. Thereby, the aim of optimization is shifted from the individual and its endogenous physiological functions towards exogenous factors of the sleep environment to be altered to enable sleep at any given time of the 24-hour day.

Whereas the first mode can be read as reoccurring resistance to the environmental and seasonal specifics of Arctic nature and alternating working shifts, the second mode of ordering sleep is based on a very different relationship to the specifics of the local environment and daily life timings itself.

Norms revolving around the timing of sleep are disregarded, and spending time for sleep itself is given minor priority in the second mode. Instead, in this trajectory sleeping hours are pushed to the margins of the 24-hour day. Sleep timing devices mainly serve as tools to limit sleep duration and enable disruption during on-call shifts. Sleep hours are reserved for whenever professional or private life does not seek attention, care, or action.

The two modes present opposite trajectories of daily sleeping practice concerning their respective relation to common images of a “normal” sleep schedule (as in a minimum of seven hours of rest during the night). While in the first mode, sleep is aligned to “normal” sleep-wake cycles as much as possible by re-creating a “natural” course of the daylight, in the second mode, these norms are rejected or deemed unimportant, in extension sleep, too.

However, both modes present trajectories concerning daily sleep management which are enabling highly flexible and constantly changing as well as temporally and spatially detached daily sleep practices. The notion of “sleep of any time” describes these daily sleep timing practices categorised within these two modes despite external factors (working hours, environmental time cues, care responsibilities, etc.) disabling sleep schedules within stable hours or a constant rhythm, which are arguably the two main focuses when aiming to enforce “normal sleep.”

The notions “sleep of others” (Kroker 2007) and “sleep of ourselves” (Williams et al. 2015) allowed theorising about, among others, the subjective meaning makings concerning the relationship of sleep and health, and societal expectations about sleep-wake rhythms during the 24-hour day. The “sleep of any time” points towards an understanding of sleep as a daily device-mediated practice within a specific interwoven local, network of social, material, and temporal arrangements.

Despite this trend of increasing neoliberal, chronocapitalist sleep optimisation, it is argued that sleep and sleep timings outside of “normal” hours are not a novel phenomenon. Sleeping instead has always been a more flexible, individual, daily practice as commonly perceived and was handled with more flexibility and heterogeneity across different social and local realities.

9. Conclusion

In sum, the introduced notion “sleep of anytime” serves as an analytic to further elaborate the entanglements between knowledge, technology, and sleep in daily practice and how sleeping is quite the opposite of an unconditional act of non-action but enabled through and enacted within heterogenous, global-local, subjective meaning makings and social norms, socio-technical environments, and timings.

The discussed matters of sleep of Northern Norwegian hospital staff introduce a research perspective on sleep as a temporally and locally entangled daily practice constantly being managed or mediated through devices. It is argued that the significance of sleep timing devices as daily management technologies becomes particularly visible when sleep is marginalised or becomes a concern due to work-life conditions not matching the normative and/or subjective expectation of a “good night’s rest.”

In this article too, the uncommonness of the described sleeping practices was underlined several times. However, it is important to acknowledge, that non-standardised, desynchronised, or non-stable sleep timings always were the reality for a significant part of the population. May it be due to shift work; care responsibilities for non-stable sleepers such as the unfit, elderly, or infants; or other myriad reasons, it has always been crucial to the basic functioning of societies that an altering but significant amount of the population was and is scheduling its sleeping hours flexibly and fluidly at “any time” of a 24-hour day. Arctic shift workers’ sleeping practices might be specific but certainly are not “unnatural,” “non-normal,” or unique.

Sleeping, as it turns out, is another good example of how daily doings in practice are never “natural” in the sense of untouched, unmanaged, or performed detached from norms or broader socio-cultural standards. According to Rose, the idea of seeking health as a way towards a natural human state of being itself is misleading, since humans have again and again tried to alter and optimise physical and psychological well-being through whatever obtainable means or matters (Rose 2007). Sleep timing devices follow trends, gadgets, and applications promising increasing sleep quality, effectiveness, or performance and productivity enhancement come and all too often disappear soon thereafter. Research in the social study of technology often follows this tendency of focusing on novelty and innovation rather than significance to daily life. In reference to the Latourian term “matters of concern” (meant as a “descriptive tool” and alternative to positivist modes of scientific knowledge production merely or solely interested in “matters of fact”) (Latour 2004), science and technology studies’ scholar María Puig de la Bellacasa argues for a shift of perception in an effort to reconceive “matters of concern” as “matters of care” (Puig de la Bellacasa 2017b, 2011). Rather than attempting (and failing) to turn the “unfit” or “absent” into a standardised “matter of concern,” she argues for a research mode which attentively relates to and cares for formerly “neglected” technoscientific things (and practices) and being sensitive regarding knowledge claims, exclusions, and violence. The necessity of matters for daily sleeping practices points towards the requirement to increasingly care for mundane sleep practices and its devices-in-use in future sleep research in science and technology studies and beyond.

References

- Adam, Barbara. 2021. Academic Timescapes in Focus. In *Inquiring Academic Timescapes*, ed. Filip Vostal. Bingley: Emerald Publishing Limited.
- Arendt, Josephine. 2010. Shift Work: Coping with the Biological Clock. *Occupational Medicine (Oxford, England)* 60 (1): 10-20. doi: [10.1093/occmed/kqp162](https://doi.org/10.1093/occmed/kqp162).
- Arendt, Josephine. 2012. Biological Rhythms During Residence in Polar Regions. *Chronobiology International* 29 (4): 379-394. doi: [10.3109/07420528.2012.668997](https://doi.org/10.3109/07420528.2012.668997).
- Ashmore, Paul. 2011. Bedtime Material: Recording Becoming Asleep. *Area* 43 (2): 211-217. doi: [10.1111/j.1475-4762.2010.00986.x](https://doi.org/10.1111/j.1475-4762.2010.00986.x).
- Barrett, Deirdre, and Patrick McNamara. 2012. *Encyclopedia of Sleep and Dreams: MY*. Vol. 2. Greenwood: ABC-CLIO.
- Bille, Mikkel, and Tim Flohr Sørensen. 2007. An Anthropology of Luminosity: The Agency of Light. *Journal of Material Culture* 12 (3): 263-284. doi: [10.1177/1359183507081894](https://doi.org/10.1177/1359183507081894).
- Birth, Kevin. 2007. Time and the Biological Consequences of Globalization. *Current Anthropology* 48 (2): 215-236. doi: [10.1086/510472](https://doi.org/10.1086/510472).
- Boivin, Diane B., and Philippe Boudreau. 2014. Impacts of Shift Work on Sleep and Circadian Rhythms. *Pathologie Biologie* 62 (5): 292-301. doi: [10.1016/j.patbio.2014.08.001](https://doi.org/10.1016/j.patbio.2014.08.001).
- Christensen, Matthew A., Laura Bettencourt, Leanne Kaye, Sai T. Moturu, Kaylin T. Nguyen, Jeffrey E. Olgin, Mark J. Pletcher, and Gregory M. Marcus. 2016. Direct Measurements of Smartphone Screen-Time: Relationships with Demographics and Sleep. *PLOS ONE* 11 (11): e0165331. doi: [10.1371/journal.pone.0165331](https://doi.org/10.1371/journal.pone.0165331).
- Coveney, Catherine M. 2014. Managing Sleep and Wakefulness in a 24-Hour World. *Sociology of Health & Illness* 36 (1): 123-136. doi: [10.1111/1467-9566.12046](https://doi.org/10.1111/1467-9566.12046).
- Crook, Tom. 2008. Norms, Forms and Beds: Spatializing Sleep in Victorian Britain. *Body & Society* 14 (4): 15-35. doi: [10.1177/1357034X08096893](https://doi.org/10.1177/1357034X08096893).
- Dumont, Marie, Dalila Benhaberou-Brun, and Jean Paquet. 2001. Profile of 24-h Light Exposure and Circadian Phase of Melatonin Secretion in Night Workers. *Journal of Biological Rhythms* 16 (5): 502-511. doi: [10.1177/074873001129002178](https://doi.org/10.1177/074873001129002178).
- Ebbensgaard, Casper Laing, and Tim Edensor. 2021. Walking with Light and the Discontinuous Experience of Urban Change. *Transactions of the Institute of British Geographers* 46 (2): 378-391. doi: [10.1111/tran.12424](https://doi.org/10.1111/tran.12424).
- Flick, Uwe. 2018. *Designing Qualitative Research*. Los Angeles: Sage.
- Flo, Elisabeth, Ståle Pallesen, Nils Magerøy, Bente E. Moen, Janne Grønli, Inger H. Nordhus, and Bjørn Bjorvatn. 2012. Shift Work Disorder in Nurses - Assessment, Prevalence and Related Health Problems. *Plos One* 7 (4): 9. doi: [10.1371/journal.pone.0033981](https://doi.org/10.1371/journal.pone.0033981).
- Ganesan, Saranea, Michelle Magee, Julia E. Stone, Megan D. Mulhall, Allison Collins, Mark E. Howard, Steven W. Lockley, Shantha M. W. Rajaratnam, and Tracey L. Sletten. 2019. The Impact of Shift Work on Sleep, Alertness and Performance in Healthcare Workers. *Scientific Reports* 9 (1). Nature Publishing Group: 4635. doi: [10.1038/s41598-019-40914-x](https://doi.org/10.1038/s41598-019-40914-x).
- Geest, Sjaak van der, and Geert Mommersteeg. 2006. Beds and Culture: Introduction. *Medische Antropologie* 18 (1): 7-17.

- Glaskin, Katie, and Richard Chenhall. 2013. *Sleep around the World: Anthropological Perspectives*. Houndmills, Basingstoke, Hampshire; New York: palgrave macmillan.
- Hansen, Vidje, Eiliv Lund, and Tone Smith-Sivertsen. 1998. Self-Reported Mental Distress under the Shifting Daylight in the High North. *Psychological Medicine* 28 (2): 447-452.
- Härmä, Mikko. 2013. Psychosocial Work Characteristics and Sleep – a Well-Known but Poorly Understood Association. *Scandinavian Journal of Work, Environment & Health* 39 (6): 531-533. doi: [10.5271/sjweh.3389](https://doi.org/10.5271/sjweh.3389).
- Härmä, Mikko, Per Gustavsson, and Henrik A Kolstad. 2018. Shift Work and Cardiovascular Disease – Do the New Studies Add to Our Knowledge? *Scandinavian Journal of Work, Environment & Health* 44 (3): 225-228. doi: [10.5271/sjweh.3727](https://doi.org/10.5271/sjweh.3727).
- Härmä, Mikko, and Göran Kecklund. 2010. Shift Work and Health - How to Proceed? *Scandinavian Journal of Work, Environment & Health* 36 (2): 81-84.
- Hersey, Tricia. 2022. *Rest Is Resistance: Free Yourself from Grind Culture and Reclaim Your Life*. London: Hachette UK.
- Hsu, Eric L. 2014. The Sociology of Sleep and the Measure of Social Acceleration. *Time & Society* 23 (2): 212-234. doi: [10.1177/0961463x13486729](https://doi.org/10.1177/0961463x13486729).
- Hsu, Eric L. 2015. The Sociological Significance of Non-Human Sleep. *Sociology* 51 (4): 865-879. doi: [10.1177/0038038515616353](https://doi.org/10.1177/0038038515616353).
- Johnsen, May Trude, Rolf Wynn, and Trond Bratlid. 2012. Is There a Negative Impact of Winter on Mental Distress and Sleeping Problems in the Subarctic: The Tromsø Study. *BMC Psychiatry* 12 (225). doi: [10.1186/1471-244X-12-225](https://doi.org/10.1186/1471-244X-12-225).
- Kraftl, Peter, and John Horton. 2008. Spaces of Every-Night Life: For Geographies of Sleep, Sleeping and Sleepiness. *Progress in Human Geography* 32 (4): 509-524.
- Kroger, Kenton. 2007. *The Sleep of Others and the Transformations of Sleep Research*. Toronto [i.a.]: Univ. of Toronto Press.
- Latour, Bruno. 2004. Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. *Critical Inquiry* 30 (2): 225-248. doi: [10.1086/421123](https://doi.org/10.1086/421123).
- Laurent, Justine, Oliver Human, Carolina Domínguez Guzmán, Els Roding, Ulrike Scholtes, Marianne Del Laet, and Annemarie Mol. 2021. Excreting Various, On Contrasting as an Analytic Technique. In *Experimenting with Ethnography: A Companion to Analysis*, ed. Andrea Ballesterio and Brit Ross Winthereik, 30-40. Durham/London: Duke University Press. doi: [10.1215/9781478013211](https://doi.org/10.1215/9781478013211).
- Lippert, Ingmar, and Julie Sascia Mewes. 2021a. Data, Methods and Writing. *Science & Technology Studies* 34 (3): 2-16. doi: [10.23987/sts.110597](https://doi.org/10.23987/sts.110597).
- Lippert, Ingmar, and Julie Sascia Mewes, eds. 2021b. Methodography of Data Practices in STS's Ethnographic Collaboration and Participant Observation. *Science & Technology Studies* 34 (3): 2-6. doi: [10.23987/sts.110597](https://doi.org/10.23987/sts.110597).
- Mansukhani, Meghna P., Bhanu Prakash Kolla, Salim Surani, Joseph Varon, and Kannan Ramar. 2012. Sleep Deprivation in Resident Physicians, Work Hour Limitations, and Related Outcomes: A Systematic Review of the Literature. *Postgraduate Medicine* 124 (4): 241-249.
- Marres, Noortje. 2012. *Material Participation: Technology, the Environment and Everyday Publics*. Houndmills, Basingstoke, Hampshire; New York: palgrave macmillan.
- Marres, Noortje. 2017. *Digital Sociology: The Reinvention of Social Research*. Malden: John Wiley & Sons.

- Matheson, Annabel, Louise O'Brien, and Jo-Anne Reid. 2014. The Impact of Shiftwork on Health: A Literature Review. *Journal of Clinical Nursing* 23 (23-24): 3309-3020. doi: [10.1111/jocn.12524](https://doi.org/10.1111/jocn.12524).
- Meadows, Robert. 2016. The Importance of Viewing Sleep as a "Practice." *Addiction* 111 (6): 1094-1095. doi: [10.1111/add.13358](https://doi.org/10.1111/add.13358).
- Mewes, Julie Sascia. 2019. *Alltagswerkstatt: Alltagsbefähigungspraktiken in der psychiatrischen Ergotherapie*. Bielefeld: Transcript.
- Mewes, Julie Sascia. 2021. "Sleep Routines of Shift Workers." Audio Feature for public display in "The World is in You" exhibition, Kunsthal Charlottenborg (DK) in cooperation with Medical Museion & University of Copenhagen.
- Mewes, Julie Sascia. 2023. Time to Sleep – Arctic Health Care Professionals Coordinating "Bedtime" Through Devices in Absence of "Natural" Zeitgeber. In *DGEKW Kongressband 2022*, ed. Manuel Trummer. Vol. 43. Münster: Waxmann.
- Mewes, Julie Sascia, and Ingmar Lippert. 2023. Caring for Methods: Towards Methods as "Matters of Care" through Methodography (Working Title). In *Ethical and Methodological Dilemmas in Social Science Interventions - Careful Engagements in Healthcare, Museums, Design and Beyond*, ed. Doris Lydahl and Niels Christian M. Nickelsen. Springer.
- Mewes, Julie Sascia, and Sebastian von Peter. 2013. Die kollektiven ordnungsgebenden Modi des Stimmenhörens [The Collective Modes of Ordering of the Voice-Hearing Experience.]. *Psychiatrische Praxis* 41 (1): 23-28. doi: [10.1055/s-0033-1343201](https://doi.org/10.1055/s-0033-1343201).
- Mewes, Julie Sascia, and Estrid Sørensen. 2017. Ethnographies of Objects in Science and Technology Studies. *Ethnographies of Objects in Science and Technology Studies* 1: 1-89.
- Meyer, Nicholas, Allison G. Harvey, Steven W. Lockley, and Derk-Jan Dijk. 2022. Circadian Rhythms and Disorders of the Timing of Sleep. *The Lancet* 400 (10357): 1061-1078. doi: [10.1016/S0140-6736\(22\)00877-7](https://doi.org/10.1016/S0140-6736(22)00877-7).
- Mol, Annemarie. 2002. *The Body Multiple: Ontology in Medical Practice*. Durham/London: Duke University Press.
- Moreira, Tiago. 2006. Sleep, Health and the Dynamics of Biomedicine. *Social Science & Medicine* 63 (1): 54-63. doi: [10.1016/j.socscimed.2005.11.066](https://doi.org/10.1016/j.socscimed.2005.11.066).
- Moser, Ingunn. 2005. On Becoming Disabled and Articulating Alternatives - The Multiple Modes of Ordering Disability and Their Interferences. *Cultural Studies* 19 (6): 667-700.
- Mulvin, Dylan. 2018. Media Prophylaxis: Night Modes and the Politics of Preventing Harm. *Information & Culture* 53 (2): 175-202. doi: [10.7560/IC53203](https://doi.org/10.7560/IC53203).
- Nicolini, Davide. 2009. Articulating Practice through the Interview to the Double. *Management Learning* 40 (2): 195-212.
- Ose, Solveig Osborg, Hilde Færevik, Tove Håpnes, and Lisbeth Øyum. 2022. Perceived Causes of Work-Related Sick Leave Among Hospital Nurses in Norway: A Prepandemic Study. *Safety and Health at Work* 13 (3): 350-356. doi: [10.1016/j.shaw.2022.04.002](https://doi.org/10.1016/j.shaw.2022.04.002).
- Pallesen, Ståle, Bjørn Bjorvatn, Nils Magerøy, Ingvild Berg Saksvik, Siri Waage, and Bente Elisabeth Moen. 2010. Measures to Counteract the Negative Effects of Night Work. *Scandinavian Journal of Work, Environment & Health* 36 (2): 109-120. doi: [10.5271/sjweh.2886](https://doi.org/10.5271/sjweh.2886).

- Pallesen, Ståle, Bjørn Bjorvatn, Siri Waage, Anette Harris, and Dominic Sagoe. 2021. Prevalence of Shift Work Disorder: A Systematic Review and Meta-Analysis. *Frontiers in Psychology* 12. doi: [10.3389/fpsyg.2021.638252](https://doi.org/10.3389/fpsyg.2021.638252).
- Pallesen, Ståle, Inger H. Nordhus, Geir H. Nielsen, Odd E. Havik, Gerd Kvale, Bjørn H. Johnsen, and Svein Skjotskift. 2001. Prevalence of Insomnia in the Adult Norwegian Population. *Sleep* 24 (7): 771-779.
- Puig de la Bellacasa, María. 2011. Matters of Care in Technoscience: Assembling Neglected Things. *Social Studies of Science* 41 (1): 85-106. doi: [10.1177/0306312710380301](https://doi.org/10.1177/0306312710380301).
- Puig de la Bellacasa, María. 2017. *Matters of Care: Speculative Ethics in More than Human Worlds*. Minneapolis: University of Minnesota Press.
- Reiss, Benjamin. 2017. *Wild Nights: How Taming Sleep Created Our Restless World*. New York: Basic Books.
- Rose, Nikolas. 2007. *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century*. Princeton: Princeton University Press.
- Saksvik, Ingvild B., Bjørn Bjorvatn, Hilde Hetland, Gro M. Sandal, and Ståle Pallesen. 2011. Individual Differences in Tolerance to Shift Work--a Systematic Review. *Sleep Medicine Reviews* 15 (4): 221-35. doi: [10.1016/j.smrv.2010.07.002](https://doi.org/10.1016/j.smrv.2010.07.002).
- Sivertsen, Børge, Oddgeir Friberg, Ståle Pallesen, Øystein Vedaa, and Laila Arnesdatter Hopstock. 2021. Sleep in the Land of the Midnight Sun and Polar Night: The Tromsø Study. *Chronobiology International* 38 (3): 334-342. doi: [10.1080/07420528.2020.1845191](https://doi.org/10.1080/07420528.2020.1845191).
- Skeldon, Anne C., Andrew J. K. Phillips, and Derk-Jan Dijk. 2017. The Effects of Self-Selected Light-Dark Cycles and Social Constraints on Human Sleep and Circadian Timing: A Modeling Approach. *Scientific Reports* 7 (45158). doi: [10.1038/srep45158](https://doi.org/10.1038/srep45158).
- Sletten, Tracey L., Jason P. Sullivan, Josephine Arendt, Lawrence A. Palinkas, Laura K. Barger, Lloyd Fletcher, Malcolm Arnold, et al. 2022. The Role of Circadian Phase in Sleep and Performance during Antarctic Winter Expeditions. *Journal of Pineal Research* 73 (2). doi: [10.1111/jpi.12817](https://doi.org/10.1111/jpi.12817).
- Van Dongen, Els. 2007. Anthropology on Beds: The Bed as the Field of Research. *Anthropology Today* 23 (6): 23-26.
- Wagstaff, Anthony Sverre, and Jenny-Anne Sigstad Lie. 2011. Shift and Night Work and Long Working Hours - a Systematic Review of Safety Implications. *Scandinavian Journal of Work, Environment & Health* 37 (3): 173-185. <https://www.jstor.org/stable/41151541>.
- Wajcman, Judy. 2008. Life in the Fast Lane? Towards a Sociology of Technology and Time. *The British Journal of Sociology* 59 (1): 59-77. doi: [10.1111/j.1468-4446.2007.00182.x](https://doi.org/10.1111/j.1468-4446.2007.00182.x).
- Wajcman, Judy. 2019. The Digital Architecture of Time Management. *Science, Technology, & Human Values* 44 (2): 315-337. doi: [10.1177/0162243918795041](https://doi.org/10.1177/0162243918795041).
- Watson, Nathaniel F., M. Safwan Badr, Gregory Belenky, Donald L. Bliwise, Orfeu M. Buxton, Daniel Buysse, David F. Dinges, et al. 2015. Recommended Amount of Sleep for a Healthy Adult: A Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society. *SLEEP* 38 (6): 843-844. doi: [10.5665/sleep.4716](https://doi.org/10.5665/sleep.4716).
- Williams, Simon. 2005. *Sleep and Society: Sociological Ventures into the Un (Known)*. London: Routledge.

- Williams, Simon. 2011. *The Politics of Sleep: Governing (Un) Consciousness in the Late Modern Age*. Houndmills, Basingstoke, Hampshire; New York: palgrave maxmillan.
- Williams, Simon, Catherine M. Coveney, and Jonathan Gabe. 2013. Medicalisation or Customisation? Sleep, Enterprise and Enhancement in the 24/7 Society. *Social Science & Medicine* 79 (Supplement C): 40-47. doi: [10.1016/j.socscimed.2012.07.017](https://doi.org/10.1016/j.socscimed.2012.07.017).
- Williams, Simon, Catherine Coveney, and Robert Meadows. 2015. "M-apping" Sleep? Trends and Transformations in the Digital Age. *Sociology of Health & Illness* 37 (7): 1039-1054. doi: [10.1111/1467-9566.12283](https://doi.org/10.1111/1467-9566.12283).
- Williams, Simon, and Nick Crossley. 2008. Introduction: Sleeping Bodies. *Body & Society* 14 (4): 1-13. doi: [10.1177/1357034X08096892](https://doi.org/10.1177/1357034X08096892).
- Williams, Simon, Robert Meadows, and Catherine M. Coveney. 2021. Desynchronised Times? Chronobiology, (Bio)Medicalisation and the Rhythms of Life Itself. *Sociology of Health & Illness* 43 (6): 1501-1517. doi: [10.1111/1467-9566.13324](https://doi.org/10.1111/1467-9566.13324).
- Williams, Simon, and Matthew Wolf-Meyer. 2013. Longing for Sleep: Assessing the Place of Sleep in the 21st Century. *Somatosphere: Science, Medicine and Anthropology* March 19-22.
- Wolf-Meyer, Matthew. 2012. *The Slumbering Masses: Sleep, Medicine, and Modern American Life*. Minneapolis: University of Minnesota Press.

All articles published in HSR Special Issue 47 (2022) 4:
Sleep, Knowledge, Technology

Introduction

Hannah Ahlheim, Dariuš Zifonun & Nicole Zillien
Sleep, Knowledge, Technology. An Introduction.
doi: [10.12759/hsr.48.2023.13](https://doi.org/10.12759/hsr.48.2023.13)

Contributions

Julia Vorhölter
Sleeping with Strangers – Techno-Intimacies and Side-Affects in a German Sleep Lab.
doi: [10.12759/hsr.48.2023.14](https://doi.org/10.12759/hsr.48.2023.14)

Dariuš Zifonun, Svenja Reinhardt & Sebastian Weste
Rescaling the Patient. The Diagnosis of Sleep-Related Problems in the Sleep Laboratory.
doi: [10.12759/hsr.48.2023.15](https://doi.org/10.12759/hsr.48.2023.15)

Hannah Ahlheim & Jonathan Holst
“Masters” of Time. Chrono-Biologizing Sleep in the 20th Century.
doi: [10.12759/hsr.48.2023.16](https://doi.org/10.12759/hsr.48.2023.16)

Julie Sascia Mewes
Matters of Sleep. Sleep Timing Devices Towards a “Sleep of Any Time.”.
doi: [10.12759/hsr.48.2023.17](https://doi.org/10.12759/hsr.48.2023.17)

Mina Lunzer
Sleep as Movement/Sleep as Stillness. Colliding “Objects” at the Scientific Exhibition *Dreamstage* (1977).
doi: [10.12759/hsr.48.2023.18](https://doi.org/10.12759/hsr.48.2023.18)

Ben Lyall and Bjørn Nansen
Redefining Rest: A Taxonomy of Contemporary Digital Sleep Technologies.
doi: [10.12759/hsr.48.2023.19](https://doi.org/10.12759/hsr.48.2023.19)

Nicole Zillien, Nico Wettmann & Frederik Peper
Sleep Experiments. Knowledge Production through Self-Tracking.
doi: [10.12759/hsr.48.2023.20](https://doi.org/10.12759/hsr.48.2023.20)

Diletta De Cristofaro & Simona Chiodo
Quantified Sleep: Self-Tracking Technologies and the Reshaping of 21st-Century Subjectivity.
doi: [10.12759/hsr.48.2023.21](https://doi.org/10.12759/hsr.48.2023.21)

Christine Hine, Robert Meadows & Gary Pritchard
The Interactional Uses of Evidenced Sleep: An Exploration of Online Depictions of Sleep Tracking Data.
doi: [10.12759/hsr.48.2023.22](https://doi.org/10.12759/hsr.48.2023.22)