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# Sleeping with Strangers – Techno-Intimacies and Side-Affects in a German Sleep Lab

Julia Vorhölter\*

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**Abstract:** »Fremd Schlafen – Techno-Intimitäten und Neben-Affekte in einem deutschen Schlaflabor«. This article explores the challenges of knowledge production in a sleep lab. Based on ethnographic research, and drawing on affect theory, I investigate the peculiar mix of cables and care, sensors and senses, “natural” sleep and technological tinkering, intimacy and strangeness that characterize nightly life at the lab. I discuss how the production of relevant knowledge and good therapeutic outcomes depends on the careful co-management of technologies, environments, bodies, personalities, and their various entanglements, which I capture by developing three analytical concepts: intimate space (to think about the sleep lab environment), techno-intimacy (to think about the haptic encounters between technology, bodies, and emotion), and side-affects (to think about the undesired effects of body-minds on technology). Together, the three concepts bring out how patients’ entanglements with sleep-related technologies and environments evoke intense affects and emotions which incessantly interfere with knowledge production and therapy. In order to bring about “good enough sleep” for “good enough knowledge,” trade-offs between natural sleep and techno-medical interruptions abound. As every insomniac knows, sleep resists control. The sleep lab manifests this tension writ large.

**Keywords:** Sleep laboratory, affect theory, knowledge production, intimacy, medical technology.

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## 1. Introduction

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“Do you want to put on the cables this time?” It is my second week at the sleep lab, and I am offered the chance to move from being mere observer to participant proper. “Sure,” I say to Maria,<sup>1</sup> one of two student assistants working the evening shift. “Man or woman?” she asks. “Woman,” I say without hesitating. Maria hands me the basket with the cables, electrodes, tapes, and

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<sup>1</sup> I have changed all names of research participants to pseudonyms. I have also translated all the quotes from the original German.

disinfectants, and we walk down the hotel corridor to room number 4. Our knock on the door is met with a barely audible “come in.” A woman – in her early 50s and very overweight – is sitting on her bed in her homely pyjamas. From her tense body posture, I sense her nervousness. We introduce ourselves, and Maria explains that I will now attach various cables and belts necessary for assessing sleep to different parts of her body. I add, apologetically, that it is my first time. The woman’s face remains blank, and I am not sure she understood what we said. I ask her if it is her first night here, but again she does not seem to hear my question. I repeat it and the woman nods. Everything in her body seems to say, “please just get this over and done with.” I ask her to sit on the stool next to the bed, and I kneel in front of her. Maria hands me the first cable-cum-electrode for the electrocardiograph (ECG), which needs to be attached below the breasts. I try to speak loudly when I ask the woman to lift her pyjama top and apologize when I then have to hold up her breast to clean the spot where I will stick the electrode. Slowly, I work my way through cables, electrodes, and sensors. After more than two years of the coronavirus pandemic, it feels strange coming so close to a non-masked stranger. By the time I finish, the woman is equipped with three belts, a microphone on her throat, 17 electrodes-cum-cables – on her legs, chest, under her chin, on her forehead, next to her eyes, behind her ears – and sensors for measuring breathing and oxygen saturation in the nose and on her finger. At this point, more relaxed patients always make a comment or a joke about how on earth they are supposed to sleep “normally” with all this technology dangling off them. But this woman just sits on her stool looking uncomfortable, almost terrified. Maria and I walk back into the control room, where we check whether the sensors are accurately transferring the data. Ideally, everything, from the woman’s breathing to her brain waves, should now be translated into a line on our monitor. Through the intercom, I ask the woman to move her eyes, wiggle her legs, press together her lips, count to five, hold her breath. Next to me, I hear Frederick, the other student assistant, curse about a patient’s beard which is disrupting the data flow – he already had to reattach the electrode twice, but the line on his screen is still red, signalling transmission problems. On my screen, fortunately, all the lines look “good enough,” and I tell the woman – whom I can see in her bed on camera – that we have now completed her preparation for the night.

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Based on ongoing ethnographic research in a German sleep lab, and drawing on affect theory, this article investigates the peculiar mix of cables and care, sensors and senses, “natural” sleep and technological tinkering (Mol et al. 2010), intimacy and strangeness that characterize nightly life at the lab. I discuss how the production of relevant knowledge and good therapeutic outcomes depends on the careful co-management of technologies, bodies, and

personalities and their various entanglements, and how attempts to capture and control sleep come with many trade-offs, and often fail. I ask: Under what conditions is knowledge on sleep produced in the lab and how do these conditions affect both sleep itself and the knowledge that can be produced about it? Or, more concretely: How do body-minds, technology, and environment affect sleep interplay, and how is this interplay managed in order to produce “good enough” data that can be used for diagnosis and therapy?

Sleep is a fascinating topic to study in terms of knowledge production because the object of knowledge – sleep – is inherently unstable: sleep needs to be produced before any knowledge about it can be gained. In the lab, this leads to interesting conundrums: a particular kind of “normal” sleep (and ideally at least six hours of it) is needed for reliable diagnosis, yet patients cannot “produce” it at will. Even though the term “lab” suggests a setting in which scientific knowledge is generated under controlled circumstances, this is true for the sleep lab only to a certain extent. While some processes are routinized, technical, and impersonal, others are intimate, “messy,” and unpredictable. Successful data collection in the sleep lab depends on constant tinkering with technology, pharmaceuticals, personalities, and body-minds. For instance, even though awake patients, if willing, can be carefully arranged to attach measuring technology (Zifunun, Reinhardt, and Weste 2023, in this issue), sleeping bodies are “out of control.” And even though patients may be willing to cooperate with medical knowledge production, sleep may not.

The sleep lab, in which I have been conducting fieldwork since January 2022, is located on one floor of an otherwise nondistinctive hotel, at the edge of the industrial zone of a middle-sized German city. A glass door, on the first floor of the hotel, marks the entry to the sleep lab, which stretches along a corridor in which quiet pop music gently reverberates at all hours of the day. There are eight hotel rooms with sleep assessment technology and en suite bathrooms. A ninth room has been transformed into the doctor’s office, where patient consultations take place once a week. At the end of the corridor is a small waiting area and, behind a door, a large reception, office, and control room in which the eight monitors are located. The sleep lab is run by a pneumologist (with the extra qualification “sleep doctor”)<sup>2</sup> and, as is true for most labs, is primarily equipped to deal with sleep apnea.<sup>3</sup> Patients usually

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<sup>2</sup> In Germany, there is no designated specialist or *Facharzt* for sleep medicine. This poses far-reaching problems for the treatment of sleep disorders which, however, I cannot discuss within the scope of this article. Doctors (most commonly pneumologists or ear-nose-and-throat specialists) can obtain the additional qualification (*Zusatzqualifikation*) of “sleep doctor.” The German Association for Sleep Medicine and Sleep Research (DGSM) also offers more comprehensive qualifications in somnology.

<sup>3</sup> Sleep apnea is a potentially quite serious breathing-related sleep disorder whereby people stop breathing – often several times an hour and usually without noticing it themselves – during their sleep. Due to these breathing pauses, people suffering from apnea have a very unrestful sleep

come for three consecutive nights – one night for diagnosis (the prime focus being on apnea-related events) and two nights for therapy, during which airway-pressure masks are tested and adjusted. In practice, however, patients also end up at the lab with other sleep-related problems (insomnia, in particular), which are not, or not primarily, related to apnea. Insomnia patients – although this is not officially acknowledged – disrupt the smooth functioning of the lab: they struggle (even more than others) when asked to sleep with cables and masks, they do not sleep the six hours officially required for meaningful assessment, and they take up too much time in consultations. Yet, even in “uncomplicated patients” with less troubled minds – who sleep well, are not disturbed by the cables, and accept mask therapy – the mere physiology of their body (hair, facial shapes, stature) can sometimes cause problems.

In the sleep lab, I argue, bodies, minds, and technology are in a complex relation of co-dependency. Minds are affected by technology, which in turn has an effect on bodies; bodies react to technology, which affects minds; technology is set up to measure, or correct, particular (non-)workings of the body-mind in sleep (movements, brain waves, sounds, breathing), yet some reactions or pathologies (sweating, sleeplessness, panic) resist or render impossible technological interventions. Some pathologies – apnea, restless legs, parasomnias – are magically revealed through technology, while others (insomnia, in particular) are sometimes eradicated through pills.<sup>4</sup> In order to bring about “good enough sleep” for “good enough knowledge,” trade-offs between (an imagined) natural sleep and techno-medical interruptions abound. Mol, Moser, and Pols’s (2010) notion of tinkering is helpful here, because it brings out the fundamental messiness that is inherent in attempts to assess and act on sleep – which is itself a complex and still little-understood phenomenon of body-mind-interplay with shifting control centres in the brain, cells, and organs (e.g., Samson 2021).<sup>5</sup>

In this article, I use the notion of affect to think through the interplay of people, body-minds, and technology in the sleep lab environment. In the

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and are often tired in the mornings without knowing why. Apnea also cause massive drops in oxygen saturation which, over time, can lead to heart failure, dementia, and diabetes. Most sleep labs in Germany focus on sleep apnea, which is the most common sleep disorder. There are also designated psychiatric or neurological sleep labs which specialize in non-breathing-related sleep disorders (insomnia, parasomnias, narcolepsy, etc.).

<sup>4</sup> Apnea, RLS, or parasomnia patients are often not consciously aware of their problems during sleep and are sometimes surprised when confronted with the polysomnography (PSG) results. PSG data, however, depend on sleep, which is why insomnia patients are sometimes given sleeping pills to enable comprehensive diagnosis. From my experience, apnea findings are often privileged and taken to be the cause of other sleep problems like insomnia. Or, put crudely, pathologies like apnea want to be discovered because good therapies (esp. masks) exist to deal with them, whereas insomnia is sometimes downplayed because it is more difficult to deal with.

<sup>5</sup> This uncertainty about sleep is often downplayed in the day-to-day procedures of the sleep lab, where the main aim is to get “good enough” data for diagnosis, to plan therapy, and to satisfy insurance companies who pay for both.

bourgeoning field of affect theory, affects are most prominently described, following Massumi (2002), as nonconscious intensities with the potential to activate or deactivate bodies. Others have also described affects as pre-individual bodily forces, linked to autonomic responses, which augment or diminish a body's capacity to act or engage with others (Clough and Halley 2007); as a momentum or force that disrupts or energizes (White 2017); and as involving body and mind, reason and passion (Hardt 2007). Following Deleuze, affects are distinctly non-subjective – they are sensations which can resonate in bodies, places, and environments – but which are unknown to the subject (Navaro-Yashin 2009, 12). As such, affects are also non- or pre-linguistic; they can only be captured in words after the fact. This gap – between affect and its perception and designation (as emotion, for instance) – poses particular challenges for grappling with affect and has driven scholars to experiment with new writing strategies. By evoking affects, rather than describing them, affect scholars seek to capture that which is, by definition, unnameable, unperceivable, and elusive (e.g., Stewart 2007; cf. Skoggard and Waterson 2015).

Massumi's (2002) conceptualization of affects as nonconscious intensities with the potential to activate or deactivate bodies is particularly helpful to understand how cues in the (social) environment – heat, danger, uncertainty – register in and resonate with the body-mind. Affects are omnipresent in the sleep lab and influence knowledge production in multiple ways. For instance, the sleep lab environment makes people feel nervous and prevents them from sleeping. In the first section of the article, I complexify this idea by showing that in the sleep lab it is not just the environment that affects sleep, but that sleep itself creates affective, or intimate, space. In the second section, I deploy the notion of “techno-intimacy” to think about the haptic encounters between technology, bodies, and emotion, and to reflect on the peculiar interplay of strangeness and intimacy in the lab. In the third section, I develop the concept of “side-affect” to analyse the undesired effects of body-minds on technology. In summary, drawing on various ethnographic examples, the article brings out how patients' affective entanglements with sleep-related environments and technologies incessantly interfere with diagnosis and therapy.

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## 2. Affective Environments: The Sleep Lab as Intimate Space

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Affect [...] is the non-discursive sensation which a space or environment generates. (Navaro-Yashin 2009, 12f.)

On a bench in the garden – it is the height of the covid pandemic – I am interviewing Carol C., a former nurse and experienced sleep lab worker who has recently completed her training to become a somnologist. Carol has just accepted a job offer to start working at “my” sleep lab. She is in town for only two days to settle the contract – and had a sleepless night in a terribly uncomfortable hotel bed.

Carol: “When I’ve experienced a bad night like this myself it motivates me to try even harder with my patients. I especially find the conversations with them during the cabling-up very important and I always tell our student assistants to use that half hour they spend with the patient to talk to them, or to let them talk. It requires a certain sensitivity [*Feingefühl*], however, which you have to learn and develop over time. That is what fascinates me the most.”

Julia: “Yes, I was really struck, when attaching the cables, by the fears you encounter, and by the intimate environment of sleeping that you enter into and disrupt.”

Carol: “Exactly, that’s what we always say: we really enter into a space that is very intimate for the patient; it is a personal space and one doesn’t want to let others enter into it. It’s no one’s business, no one should know. But when you scratch the surface a little bit, carefully, and you know how to do it, you sometimes discover that the patients actually want to talk about *it*; when they realize they are sitting with someone who is knowledgeable about *such things*.”

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Sleep creates intimate space. And everyone knows the feeling of entering into it: the magical feeling of observing sleeping babies; the agitated and embarrassed feeling of glancing at sleeping strangers in the train who snore loudly or drool as they sink ever deeper into their seats; or the desperate attempts – whispering, tippy-toeing, shushing – to avert waking a sleeping visitor. Some sleeping spaces, like bedrooms, are clearly designated *a priori* as intimate and personal. Intimate spaces, however, also emerge through and around sleep itself: they are spatio-bodily-affective realms that surround the sleeper. The presence of a sleeper can change a space and the way people inhabit it: they may stop talking or move away, or they may experience emotional reactions (like annoyance, fondness, surprise or worry).

In Germany, most people prefer to withdraw to a separate space when sleeping – because they do not want to be disturbed, because they are ashamed of, or worried about, uncontrollable, often unconscious, sleep-related behaviour (like snoring, screaming, tossing), or simply because they have been raised from a young age to do so. In many ways then, and as Carol emphasizes in the interview extract above, the sleeping space is a personal and intimate one – both for the sleeper and the awake observer. Note Carol’s language in the quote above: she speaks of “it” and “such things” – that which

is “no one’s business” – formulations which capture the elusiveness and the secrecy surrounding sleep.

The concept of the sleep lab profoundly disrupts not just the intimacy of people’s sleep, but also the etiquette of how to treat a sleeping person: people are woken up to fix cables, they are observed on camera while sleeping, and shameful sleep-behaviours are not only witnessed but recorded and analysed. And even the most personal sphere of dreaming is registered, if not yet dissected for content. Sleep labs are different from other spaces in which people sleep – private bedrooms, hotel rooms, hospitals, or trains – because labs are deliberately set up to intervene in the most intimate sphere of sleep itself. Patients, together with technology, are there to produce sleep data. And watching them can feel – this was my experience at least – profoundly voyeuristic.

Sleep labs are not intimate spaces as such. It is not simply the environment that generates affect – as in the case of the ruins Navaro-Yashin (2009) discusses in her work on affective space. During day-time, sleep labs often feel harmless, lifeless, administrative, or – like hospital-based labs – simply clinical. Sleep labs turn into intimate spaces through the presence of prospective sleepers and the related anxious anticipation – among staff and patients alike – of sleep. In the evening hours, and at night, traces of intense affects can be sensed everywhere: in the waiting area where nervous-looking first-night patients are comforted by their more experienced second- and third-night peers; at the reception where patients worry, argue, or silently receive instructions while the computers, which will later feed on their data, boot up in the background; and on admission questionnaires in which patients try to put into words their frustrations and anxieties related to sleep, illness, and life more generally. Affects resonate during the cabling-up when staff and electrodes come in close contact with aging, sickly, or fleshy skin, and patients tense up in their homely pyjamas; after bedtime, when most patients slip easily into N2 slumber, but a few are tortured by sleeplessness which – for the smooth functioning of the lab – should be avoided at any cost; and in the middle of the night when masked-up patients panic, rage, or cry due to the unfamiliar intimacy with their breathing aids. Through the interplay of sleepers, non-sleepers, observers, and the environment in which they meet, sleep labs *become* intimate spaces in which – as I further discuss in the next section – knowledge production, technology, and care are inseparably entangled.

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### 3. Techno-Intimacy

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[W]e understand techno-intimacy as the very process of forming a co-constitutive and co-evolving relationship between technology and human emotion. Within this relationship, haptic contact zones become a critical site



where human affect and technological affordance are encountered, transduced, and reconstituted, shaping new stories and relationships. (Katsuno and White 2022, 253)

It has been a long morning of patient consultations and, as usual, Dr. Denissen is far behind her schedule. Most sleep patients and their problems need much more time than the ten minutes calculated for by the medical system. I introduce myself to the last patient for today – a confident-looking, middle-aged, athletic but slightly overweight man – while Dr. Denissen accompanies the previous patient to the reception area. Upon her return, with unwavering energy, she goes through her usual routine: introductions, anamnesis, and, importantly, the patient’s report of how and why he ended up at the sleep lab. The man’s case is fairly typical for an apnea patient: he reports feeling tired and exhausted all the time and adds, with a chuckle, that he was “strongly encouraged” by his wife to go for a medical check-up because of his loud snoring and recurrent nightly breathing pauses followed by loud gasps for air. He is here today to discuss the results of his home respiratory polygraphy (PG)<sup>6</sup> – a necessary pre-diagnostic procedure for sleep lab referral usually commissioned by an ear-nose-and-throat specialist or a pneumologist. While Dr. Denissen opens the PG results on her computer, she and the man joke casually about the effects of snoring on family relations, the man’s problematic throat anatomy, and about his high-paced work as a self-employed insurance agent. After only a brief look at the PG graph, Dr. Denissen abruptly stops the happy banter: “You have massive and extremely frequent drops of blood oxygen levels in your sleep,” she says, obviously (and for her unusually) shocked. The patient does not seem to grasp the seriousness of what she is saying and trying to show him on the screen. He unconcernedly repeats that he has already scheduled a throat operation with his doctor which should fix the problem, but that he is happy to also spend two or three nights at the sleep lab for further diagnosis – if absolutely necessary. Dr. Denissen now seems annoyed by his cool attitude: “What this PG shows is no joking matter. You have serious apnea and it looks like you have had it for a long time. You are at a high-risk for hypotension, heart failure, dementia, and diabetes. This apnea is not just obstructive [i.e., caused by a mechanical problem that blocks the airway], but seems to also be coming from your brain [so-called central sleep apnea]. We should get you into the lab and start mask therapy as soon as possible!” Now it is the man who looks alarmed. He points at a model CPAP<sup>7</sup>-mask on display in the doctor’s office: “You want me to wear that?”

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<sup>6</sup> This so-called PG is done at home using a portable device which usually records nasal airflow, thoracic and abdominal movements, heart rate and oxygen saturation. It can detect apnea, but not as comprehensively as the polysomnography (PSG), which is done, if the PG apnea score is above a certain level, as a follow-up at the lab.

<sup>7</sup> Continuous positive airway pressure. CPAP-masks deliver a stream of oxygenated air into the patient’s nose and/or mouth and thus prevent airways from collapsing and obstructing breathing during sleep.

There is no way I will sleep with such a device! I have been married for 20 years and it's hard enough to cultivate feelings of attraction and maintain reasonable levels of activity in the bedroom. Despite kids and everything, my wife and I have been managing surprisingly well – but with a mask in the bedroom? That will just destroy our sex life.”

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While masks are celebrated – by doctors, researchers, and many patients as the “gold standard” of apnea treatment – the idea of having them on the face and in the bedroom every night often comes as a shock to patients. Some, like the man in the vignette, worry about becoming unattractive to their bed and sexual partners; many fear that the mask apparatus will cause noise pollution in the intimate space of the bedroom. While most patients agree, albeit reluctantly, to try them, and many end up using them regularly and with success, some body-minds make mask therapy impossible. It is not only the awkwardness of having air pumped into the throat but also the haptic encounter with the mask – which covers the nose, or mouth and nose, and whose straps irritate and sometimes leave marks on face and skull – that is a challenge. For mask therapy to work, technology, body, and mind need to cooperate as they share “haptic contact zones” (see introductory quote above). But cooperation is not always a choice: some people’s facial shapes create near-insurmountable challenges for mask adaptation; some people have panic attacks when the air pressure kicks in; and for some the mask brings up traumatic memories every time they encounter it. One patient, for instance, reported that her husband had died of COPD<sup>8</sup> while wearing an oxygen-mask. The woman was suffering from severe sleep apnea and had been told to try CPAP-therapy, but every time she attempted to put on the mask, it conjured the image of her dead husband, and she could not bring herself to wear it.

### 3.1 Undesired Intimacies

I propose the term techno-intimacy to capture the intimate contact between diagnostic and therapeutic technology (like electrodes, cables, airway pressure masks) and patients in the intimate context of sleep. The concept was coined by Anne Alison (2006) in her work on “millennial monsters,” like Tamagotchi, in Japan, to describe the intimacy formed between human and technologically constituted entities. More recently, the concept has been taken up by Katsuno and White (2022) to analyse AI-driven “social robots,”

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<sup>8</sup> Chronic obstructive pulmonary disease (COPD) refers to a group of diseases that cause airflow blockage and breathing-related problems.

which are designed to stimulate, detect, and respond to human emotions.<sup>9</sup> In Japanese contexts, Katsuno and White discuss how tech-developers experiment and playfully aspire to create ever greater possibilities for creating techno-intimacy between robot-beings and humans. Katsuno (2011) refers to this as “tinkering with intimacy.” Intimacy is seen as desirable, and in fact essential, for the kind of relationships that android-lovers in Japan seek with social robots. In the sleep lab, by contrast, techno-intimacy is often an undesired side-effect of technology which, like the mask, requires intimate touch, enters intimate space, or becomes witness to intimate acts.

Intimacy is a very particular affective state, based on “a close, familiar, and usually affectionate or loving personal relationship” or “the quality of being comfortable, warm, or familiar.”<sup>10</sup> As these definitions suggest, intimacy is *usually* considered a positive and desirable state that results from familiarity. Intimacy, however, can also be unwanted, oppressive, and enforced (as in the case of sexual abuse, for instance). In the sleep lab, different forms of intimacy play a role: the physical closeness during the cabling-up is sometimes experienced, by both patients and staff, as involuntary intimacy; but the same situation can also be experienced as positively intimate, for instance when staff show interest and care, and patients feel like they can talk about personal problems or worries. “Techno-intimacy” resulting from haptic contacts with measuring technology, or the presence of masks, cables, or sensors in intimate spaces, is often experienced as strange, uncanny, or even grossly inappropriate. One of my interviewees, a chronic insomniac who had gone for a diagnosis in a neuro-psychiatric lab, told me how the staff there had asked him to sleep with a rectal thermometer:

“They wanted to put a thermometer up my ass!” he said, still noticeably appalled. “I couldn’t stand it, I really had to pull that out. I thought nothing is going to make me [...] They explained that this was one of the most important measurements – your basal temperature – and I can understand that. But it seems they should have better ways of measuring that!”

As this example plainly shows, the intimate, but undesired, touch ideally required for data collection in the sleep lab sometimes gets in the way of knowledge production. To improve patient comfort, and therefore sleep data, sleep-tech designers also “tinker” with intimacy and technology – albeit with different aims than the Japanese robot engineers.

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<sup>9</sup> Techno-intimacy is a concept also deployed, more broadly perhaps, by other scholars (e.g., Weston 2017 and Patel 2016) who study how technology produces or mediates intimate encounters in or with (changing) environments and ecologies. Weston, for instance, draws on notions of intimacy to analyze how people make sense of the tensions between technological promises and ecological deterioration in a time when nature and culture, society, individual, and technology are always already co-constituted and entangled.

<sup>10</sup> <https://www.dictionary.com/browse/intimacy> (Accessed 10.10.2022).

### 3.2 Managing Intimacy: Tinkering with Sleep Technologies

Whereas the creation of intimacy is an explicit aim in the construction of social robots, “tinkering” in the context of sleep-tech development is about eliminating unwanted intimacies and normalizing the intimate presence of medical apparatuses. By creating smaller masks, quieter machines, and less invasive diagnostic equipment, developers seek to make sleep technology less disturbing, and thus more acceptable. Ideally, apnea patients will eventually come to perceive the mask as a normal part of their sleeping body. Some even become quite fond of their masks after they have experienced their positive impact on sleep quality.

As more and more troubled sleepers seek assessment and treatment, the development of, and tinkering with, sleep technology has become a profitable business. Companies come up with ever-new mask designs, researchers are experimenting with wireless polysomnography (PSG) technology,<sup>11</sup> and sleep doctors offer alternative treatments for sleep apnea. A relatively new “hype,” for instance, is the tongue pace-maker, an implanted medical device that reduces the occurrence of apnea by electrically stimulating the hypoglossal nerve, which causes tongue movement. Tongue-pacemakers have to be switched on every night before sleep but are otherwise “hidden” in the body. Even though they are even more intrusive than masks, they are imagined – by many hopeful patients – as less disruptive of the intimate sleeping environment. While this might be true for their co-sleeper(s), who do not see or hear the device, maladjusted tongue-pacemakers can be hugely disruptive of their “owner’s” sleep. I was told different stories of patients, usually sensitive sleepers, who had reported being woken up every time the nerve stimulation kicked in. Instead of having apnea events, they did not sleep at all.

Whether crafted and desired or unintended and disturbing, “techno-intimacy” draws attention to the affective, emotional, and sometimes uncanny aspects of human-machine relations. Haptic encounters – between humans and techno-pets, or between humans and medical technology – can evoke feelings of care or rejection, pleasure or repulsion, desire or panic. They can trigger emotional memories, for instance of far-away “real” pets (Katsuno and White 2022, 256ff.; see also White and Katsuno 2021) or dead husbands (see above). While technology companies become more and more advanced in producing or reducing its potential, techno-intimacy is only partially governable. Like the spatial intimacy that emerges through and around sleep, between sleeper, observer, and environment, techno-intimacy emerges, or not, in the encounter between body, mind, material, and meaning. Not everyone experiences the contact with technology as intimate: for some patients, a

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<sup>11</sup> See, for instance, <https://noxmedical.com/about/news-press/article/wireless-polysomnography/> (Accessed 10.10.2022).

cable is just a cable and a mask is just a mask. Just as for some people a robot is just a robot and not a social being they want to relate to.

Nevertheless, in the sleep lab, patients' (potentially emotional) reactions to their encounters with technology have to be reckoned with, because they affect diagnostic results and therapy compliance. Recognizing and dealing with such emotions or affects requires, as Carol above noted, a certain *Feingefühl* [literally: a fine-tuned or subtle feeling] on the side of the nightshift worker or the doctor. One patient, an old and intensely nervous woman who suffered from severe insomnia, complained bitterly about the lack of empathy she encountered among the staff:

They wanted me to sleep at least six hours, so that they would have something to evaluate in the morning. I told them I will try the best I can. But I just couldn't sleep. And the person just left, said "I'm going now." [...]. There was too much pressure. Staff here should be able to recognize when someone has trouble sleeping. But the person who put on the cables and later the mask just did not care. She went through her routines, switched on the camera, made sure the technology was working – and that was it. It was too abrupt: "I've done my job, just deal with it." Finished. I did not agree and I told her. It IS strange sleeping here. The other nightshift-workers were more understanding, that was better. They exchanged a few words with you, it helped me a little to come to terms with all this. Much more than this abrupt: "I'm switching on the machines, the camera, I wish you a good night" and then gone. No, that's not acceptable! (Interview, March 2022)

From the brief time I spoke to this patient, I learned that she was extremely sensitive to touch (she said she often could not even wear her glasses because they made her nervous), and it became clear that she worried excessively about pretty much everything. Not surprisingly, she gave up mask therapy soon after her sleep lab experience. Hers is an extreme case, and probably no amount of *Feingefühl*, empathy, and care would have helped her to sleep better in the lab or cope with the intimate touch of the mask. In fact, she was one of several patients I met whose primary problem – severe insomnia – as well as her psychological constitution seemed to have not been taken into account when prescribing mask therapy in the first place. Nevertheless, nightshift workers should be trained to recognize and engage with patients' anxieties and uncertainties, and to mediate the undesired effects of techno-intimacy rather than simply ignoring them.

### 3.3 Side-Affects

Ordinary affects, then, are [...] [a] kind of contact zone where the overdeterminations of circulations, events, conditions, technologies, and flows of power literally take place. To attend to ordinary affects is to trace how the potency of forces lies in their immanence to things that are both flighty and hard-wired, shifty and unsteady but palpable too. (Stewart 2007, 3)

“The electrode is still not recording properly.” Peter and I are standing in front of the monitor. It is 3 am. Peter is annoyed but determined: “I need to go back in and fix it.” “But he only just fell asleep again,” I offer my (unqualified) opinion. “We’re not getting the data we need and Sarah [the PSG analyst<sup>12</sup>] will complain in the morning,” Peter mumbles in response as he picks up tape, wipes and disinfectant and walks off into the corridor. I hear him knocking and, soon after, see him enter the room on camera. The patient sits up in bed, disoriented, and Peter cleans her forehead before reattaching the electrode.

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This is an ordinary scene from the sleep lab, a dilemma that recurs every night, often several times. There are different reasons why electrodes fall off: rapid body movements; hairy, oily, or sweaty skin; or patients, who – often unconsciously – pull the cables because they itch or irritate. I was told that warm summer nights are particularly bad, when patients are sweating and electrodes are slipping off all over the place. Different nightshift workers have different principles when dealing with such data-flow disruptions. Some, like Susanne, explained that they only go in before midnight but let patients sleep thereafter, even if it means missing out on some data. Others, like Peter, feel noticeably agitated when the lines on their screen are out of order. While Peter’s data will be more complete in the morning, the arousals and subsequent phases of wakefulness produced by his interruptions will also be visible on the PSG chart. By contrast, Susanne’s patients will have better sleep efficiency and fewer arousals, but relevant data – leg movements, oxygen saturation, teeth grinding – could be incomplete.

How can we conceptualize the unwanted and disruptive, but non-conscious, interactions between body-minds and technology in the process of medical diagnosis or treatment? While the term *side-effect* usually depicts undesired corollaries of technological, pharmaceutical, or material interventions (on bodies, for instance), I propose the term *side-affect* to draw attention to the undesired effects of sensing body-minds on technology. Discussions of *side-effects* – a concept which attributes some form of agency to, for instance, pills or substances whose actions go beyond what they were designed for – are omnipresent in medical debates. By contrast, *side-affects*, unintentional agencies of the body-mind which similarly disrupt techno-medical interventions, are rarely acknowledged, or at least not conceptualized as such. Yet,

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<sup>12</sup> The data produced in the sleep lab overnight is assessed by specifically trained so-called sleep scorers, who analyze sleep efficiency, sleep latency, percentage of deep and REM sleep, apnea events and their correlation with body posture and sleep stage, leg movements, oxygen saturation, and many other things based on the guidelines developed by Rechtschaffen and Kales (1968) or, more recently, the American Academy of Sleep Medicine (see <https://aasm.org/clinical-resources/scoring-manual/>, Accessed 26.04.2022).

side-*affects* are a constant force to reckon with in the sleep lab: sweating bodies make cables fall off, sleepless body-minds resist sleep data production, tired nightshift-workers fall asleep and subsequently fail to control and facilitate the smooth functioning of technology.

The difference between *effect* and *affect* is a subtle one, and the two are often confused. Various English dictionary websites offer advice on how to distinguish the two terms. According to dictionary.com, for instance,

[a]ffect is most commonly used as a verb meaning “to act on or produce a change in someone or something,” as in *Even a small adjustment can affect (change) the outcome of the experiment*. Effect is most commonly used as a noun meaning “a result or consequence,” as in *His words had the intended effect (result)*. [...] [A]ffect can also be used as a noun to refer to an emotional response or state [...], effect can also be a verb meaning “to make happen.”<sup>13</sup>

*Effect* seems to suggest causality whereas *affect* implies interrelationality. Medical language, for good reasons, is often causal. Diseases and their cures, diagnostic procedures and their outcomes, are often discussed in terms of clearly discernible causes and effects, which makes medical inventions – including their unwanted side-*effects* – seem neat and calculable. The concept of (side-)*affect* – on the surface just a humorous wordplay – challenges this apparent “orderliness.” It draws attention to the inherent messiness of medical diagnosis and treatment and the potential unruliness of medicalized body-minds, which interrelate with doctors, pharmaceuticals, or technology in unexpected ways.

An interesting case was reported to me by Carol, who had been working nightshift when the following incident occurred: A male patient, known to suffer from violent parasomnias, got up during the night, pulled off all cables and sensors, and completely trashed his sleep lab room – all without being awake or conscious of it. It would, of course, be an overinterpretation to see his actions as being specifically directed against, or triggered by, the lab technology (he had come to the lab because he experienced similar attacks at home). Nevertheless, one could perhaps analyse the destruction of lab equipment as a side-affect in (rather than of) diagnosis, a not-so-subtle, but unintentional, obstruction of medical intervention. The story is interesting in another way. In the subsequent consultation with the sleep doctor, the patient decided against pharmaceutical treatment for his parasomnia.<sup>14</sup> He had tried medication before, but while it had helped to prevent or reduce his parasomnic events, he had not been able to cope with the side-effects (fatigue and dizziness). This somewhat idiosyncratic case illustrates, if in a peculiar way, the subtle differences in undesired effects attributed (in this case by the patient) to a clearly designated pharmaceutical agent (i.e., the medication) and the

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<sup>13</sup> <https://www.dictionary.com/e/affect-vs-effect/> (Accessed, 10.10.2022).

<sup>14</sup> Instead, he decided to accept and live with his parasomnias, but to take precautions at home, like sleeping alone in a specifically prepared room.

more obscure, but equally undesired, agencies or resistances of the body-mind.

In actual fact, trying to disentangle side-effects from side-affects is but a heuristic exercise. Though often unacknowledged, in practice it is always the interplay of substance, environment, and body-mind that produces affects *and* effects. However, while the term *side-effect* seems to imply a clearly identifiable, though unavoidable, causal relation between an agent and an effect (e.g., the pill causes fatigue), the term *side-affect* draws attention to the fact that agency in medical encounters is never one-sided but multiple, never straightforward but composite, never completely predictable but always potentially random. Is it really the pill that produces the side-effect? Or is it the body-mind's resistance to the pill? Does the sensing, but unconscious, body-mind react to cables – by sweating or pulling them off? And if yes, who is the agent? The cable which triggers the body-mind, or the body-mind which affects the cable? What is cause and what is effect?

Reflecting in a more nuanced way about such questions can challenge far-reaching, taken-for-granted assumptions which underpin everyday medical practice. A compelling example is provided by Elisabeth Wilson in her critical analysis of discourses on antidepressants, in particular their proclaimed side-effects. She writes,

[T]he difference between a drug and the by-product of a drug is not clear; in these cases the boundaries between a drug effect and a side effect, between preliminary metabolism and psychoactivity, between distribution and elimination, are constantly being made and remade. *These pills are not autocratic agents that operate unilaterally on body and mind; rather, they are substances that find their pharmaceutical efficacy by being trafficked, circulated, transformed, and broken down.* (Wilson 2015, 102, my emphasis)

In a following chapter, in which Wilson aims to complexify the claim that SSRIs<sup>15</sup> have particularly dramatic side-effects (most notably suicidal ideation) in children, she elaborates:

The more we think of nonadult depressions as ongoing sedimentations of affect and cognition and sociality and nerves and blood and bone, the less likely we are to see a pharmaceutical as the cause of suicidal ideation and the more likely we are to think of a pharmaceutical as a particular kind of modulator within a complex, bio-semiological system. [...] [T]he causal pathways between pill and mind cannot be traced in a linear fashion [...]. It's not simply that there are many pathways, and more research is needed to map their complex interactions. Rather, [...] there is a mutuality between pill and mind: each gives the other form. [...] Suicidal ideation is not an isolated, extraordinary cognitive event; it is the disequilibrium of a pharmako-neuro-ideo-affect system given voice. (Wilson 2015, 156f.)

Suicidal ideation then, as Wilson describes it, is not simply a side-effect of a drug; it is an undesired consequence of interactions between medication and

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<sup>15</sup> Selective serotonin reuptake inhibitors (SSRIs) – a particular class of antidepressants.



personality, meaning, material and mind, pharmaceutical substance and bodily make-up, environment and patient. Suicidal ideation results from encounters – for some patients, but not for others. Just as technology-based diagnosis or therapy in the sleep lab is successful in some cases, but not in others. While *side-effects* are usually thought of as effects *of* something *on* something, *side-affects* happen *in* or *through* encounters. Of course, similar notions of distributed, more-than-human agency have been prominently explored in anthropology through concepts like entanglements (Barad 2007), actor-network-theory (Latour 2005) or Bateson's (1972) early reflections of the "ecology of mind." Nevertheless, the term *side-affect* is a useful addition to such debates. In playing on and complexifying the notion of side-effect, it encapsulates the indefinableness of body-mind-tech-interplays and their unintended, though often anticipated, consequences for medical interventions.

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#### 4. Conclusion: Reckoning with Affects in the Sleep Lab

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5am: Time for Peter to start waking up the patients so that he can remove their cables. Almost mechanically, he does his round: patient by patient, room by room, knocking loudly on the door two times before entering. I follow him, hesitantly, and peep around the corner as he quickly pulls off and throws away single-use electrodes and cursorily disinfectants belts and oximeter. Smells of the night linger in the bedrooms, and oxygen levels are depleted, making it unpleasant to breath. Interactions are brief: everyone is tired; everyone wants to go home.

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As one of the last tasks to complete before heading home for their own sleep, nightshift workers have to complete and sign the nightly log-sheet for every patient. The log-sheet contains information on, among other things, unusual nightly events, toilet breaks, staff interferences (to fix cables, give medication, adjust masks, etc.), oxygen saturation, and mask pressure. At the very bottom is a field in which patients' subjective experience of their sleep at the lab is recorded, usually just in a single word. Besides "horrible," "ok," and "better than expected," "strange"<sup>16</sup> is one of the most common terms used by patients to describe their night.

Even for solid sleepers, sleeping at the lab is an unusual experience. As I have argued throughout this article, this is because of the particular – intimate yet unfamiliar – atmosphere at the lab and the particular interplay of technology, bodies, and minds which have to cooperate for diagnosis and treatment. Patients sleep with strangers – with strange objects, strange

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<sup>16</sup> In German *seltsam*, *merkwürdig*, or *ungewöhnlich*.

sensations, and strangers watching. The three analytical concepts I develop in this article – intimate space, techno-intimacy, and side-affect – show how people, place, material, and meaning become intimately entangled, sometimes with undesired consequences. While a certain amount of intimacy between staff and sleepers, sensors and skin is unavoidable, too much intimacy is detrimental. I remember one evening shift when Paula hid behind her computer screen while her colleague Susanne was checking in patients. After all the patients had left for their rooms, Paula resurfaced and whispered to Susanne: “Oh my God, patient 7 is my old schoolteacher. Can you PLEASE do his cables? I cannot bear getting so close to him.”

In the sleep lab, sleep and knowledge about sleep are dependent on the cooperation between body, mind, and technology. Affects – these nonconscious intensities – have very real, practical implications. Even though they cannot be controlled, they have to be reckoned with. To achieve more accurate diagnoses, or higher therapy compliance, medical-tech companies have to anticipate affects when tinkering with sleep-related technology. Nightshift workers need to sense and empathically respond to patients’ anxieties, or to those of their colleagues. In the end, however, affects are unruly – just like sleep itself.

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