

Sleepless Lights: What Evolution Teaches About Repairing Human Sleep

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SLEEP IS A human universal. Every person on the planet requires sleep to operate properly, both mentally and physically. Over millions of years, evolution has fine-tuned human sleep so as to maximize our fitness, making it so that we could drift off to sleep in the darkness of night and rise with the sun refreshed in body and mind, ready to take on the challenges that our evolutionary environment presented. However, that environment of our ancestors is no more. Modern humanity has so completely transformed the world around us that it is nearly unrecognizable, while the once well-tuned mechanism that is our sleep has remained adjusted to the way we once lived.

The biological clocks that govern our sleep in order to provide us with the rest we need to function are themselves no longer functional, and we have ourselves to blame for it. Now, over 30% of America's population gets less than six hours of sleep every night (Rosenberg 12), and over 70 million Americans suffer from disorders related to sleep (Fahmy and Alic). This lack of sleep takes its toll — both on individuals and society as a whole. Lack of adequate sleep leads to underperformance at work, compromised immune health, and dangerous chronic disorders such as diabetes and obesity (Rosenberg 12-13). Of course, we have found ways to deal with these issues individually, but they are all tied to our chronic

lack of sleep, and that lack of sleep comes from the environment we have made for ourselves. In order to address all of these issues, we must fix our sleep. And to achieve this, we must look to the lessons of our evolutionary past. We must make changes to our current environment so that it can fit properly with our programmed sleep functions.

Within our brains, there is a region called the suprachiasmatic cortex, a biological clock that tells our bodies what time of day it is. It controls the hormones that regulate human sleep, using the light the eyes detect as a guide. In our evolutionary past, we would not have needed to think about when we should be getting to bed; we would not have needed to decide on a particular point and declare it “bedtime.” Our bodies handled that for us, recognizing when it was day from the light of the sun and easing us toward sleep as the sun set. It was not as simple as detecting when there and was not light, as the light of the moon or of our campfires was common once night had come. Instead, the suprachiasmatic cortex works with the eyes to identify the intensity and wavelength of light. Nothing was able to glow brighter than the sun, and daylight is closer to the blue end of our visual spectrum (Heying and Weinstein 97). With the advent of electric lighting, this is no longer a good metric. Candles, gaslights, and the

other forms of illumination we invented before the lightbulb were all far more advanced than the campfires of our ancestors, but they were still within the same spectrum and so did not cause any issues. As evolutionary biologists Heather Heying and Bret Weinstein explain it,

Humans have such a long history with fire that our pineal glands are well equipped to encounter red, fire-spectrum light well past sundown, without negative consequences for sleep. Being able to turn on blue, day-spectrum light at any moment, however, is a brand new phenomenon, one for which we are less well adapted. (99)

Of the alterations to our environment, the prevalence of blue light is the most serious. We have given ourselves the power to trick our bodies into thinking it is daytime at any moment we please and we are suffering for it.

Unfortunately, electric lighting has become a crucial part of society's functionality. We cannot simply stop using electric lights because of the issues they cause with sleep. Otherwise, massive worldwide change would be necessary to compensate. Jobs, education, and more are adapted to a world in which we can have as much light as we want at any point necessary. Businesses can be open well into the night thanks to electric lighting, bright street lights and car headlights allow for travel no matter the hour, and life-saving services such as hospitals require night shifts in staff to operate properly. All of this societal infrastructure is a threat to our sleep, but the scale of the changes that would be necessary to completely reinvent our relationship to electric light would likely cause too many issues to be feasible. Thankfully, some change for the better can be achieved through the principles of light already discussed above. Light that is on the same spectrum as fire does not impact sleep in the same way as blue light (Heying and Weinstein 99).

To begin, not all white light bulbs are on the same part of the color spectrum. Low-energy fluorescent and LED light bulbs have higher amounts of blue light than white incandescent light bulbs (Rosenberg 24). On an infrastructural level, then, we should use incandescent light bulbs or others designed to be low in blue light wherever possible. This way, street lights, headlights, and other necessary illumination can be made less harmful to the sleep of those who use them. On an individual level, we should promote knowledge of how blue light affects sleep so that people can know to control what type of lights they have on in their homes after dark. Already, many devices with screens have settings that filter out blue light, and there are specialized glasses designed to be worn while looking at screens. The more people know about the threats blue light poses to their sleep, the more precautions they can take, and the more incentive various companies will have to produce products to make that easier.

Beyond the corrections to deal with blue light, there are several other issues that go hand in hand with it that must also be addressed before sleep can be fully restored to its former functionality. Thanks to electric lighting, the rhythms of society are divorced from the rhythms of sleep, leading to conflicts that will often result in further sleep issues (Nunn, et al.). Work and socialization are no longer firmly tied to day and night. Work shifts may require someone to wake up at midnight, a party may last from sundown to near sunrise, and socialization through the internet makes it possible to be constantly in contact with others. Even if the lights that illuminate these activities are free of blue light and cause no sleep issues in that way, the human body's internal clock can still be thrown off by inconsistent patterns of wakefulness (Nunn, et al.).

Rising at the same time each morning

thanks to an alarm, for example, but going to bed at arbitrary times depending on what socialization is available at that time or what TV programs are available results in sleep abnormalities and their consequences. It may not be possible to change society in such a way that sleeping and waking are consistent with the evolutionary environment, but this can be improved at least in part on the level of individuals. The brain is adaptive enough to handle a non-standard sleep pattern if the pattern is made consistent and allows for enough time to sleep. Individuals struggling with sleep issues who cannot afford to change their schedule to match the sun should try to make their schedule consistent enough for their bodies to recognize it and adapt. Although a consistent sleep cycle would likely be best if it was tuned to day and night, any consistency would be better than none at all (Nunn, et al.).

Some may argue that these changes are unnecessarily intensive when it is much simpler to let medical professionals prescribe various medicines to help people get to sleep better. This is not an unfounded position. After all, prescriptions can be more personalized than large-scale changes in the design of electronic lighting, and there is already a great deal of research and production when it comes to sleep medication. Why create something from almost scratch when there is already an industry that can be expanded to deal with these issues better? The core reason to prefer environmental changes to this approach is the same reason to consider environmental changes in the first place. As Weinstine and Heying emphasize throughout *The Hunter Gatherer's Guide to the Twenty-First Century*, the

source of many modern issues is the novelty of our modern situation when compared to what we were evolved for (Heying and Weinstine).

New drugs to deal with these issues would be by necessity novel and another step away from our evolutionary past. In an attempt to solve our sleep problems — an attempt that we could not guarantee success in — we would be falling directly into the same pitfall of novelty that led to sleep problems in the first place. Even if there was some way to ensure no negative side effects of the drugs, it is still fundamentally safer to use our evolutionary past as a guide in bettering our present than to create yet more changes that push us further away from that past and into the unknown. The simpler solution is, in fact, to change the environment. It carries less inherent risk and is more certain to work.

As we are faced with the many issues related to human sleep in the modern context, the best solution is to try to bring our modern environment closer to the environment in which human sleep first evolved. It is key to the long-term well-being of individuals and society as a whole that these issues be resolved, but the balancing act to make the necessary changes without causing catastrophic disruption must be approached carefully. It may appear daunting, especially with how long we have been dependent on electric light to give us mastery over the night, but if we can approach this delicate issue with the necessary care, using our evolutionary environment as our guide, and changing our own environment instead of letting it govern us, we may be able to sleep soundly once more.

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