

sleep is a skill.

WOMEN'S HEALTH CONFERENCE 2023

# Women & Sleep: Unveiling 3 Circadian-Aligned Strategies

MOLLIE EASTMAN

THE STORY:

# My Journey To Sleep Optimization





CONTEXT:

# The Timeline of My Sleep Relationship: Bad, Terrible, Great





# Today

- Sleeping Great - Quantifiably!
- Host The #2 Sleep Podcast
- Interact w/Thousands Of People Daily To Improve Sleep
- Sleep Obsessions Monday Newsletter, 5 Years Strong
- One of the Largest Oura Ring Databases For Sleep Optimization
- Specialize In Sleep Optimization For High Stakes Poker Players
- Partnerships With Luxury Hotels & Luxury Lifestyle Brands
- Online Sleep Optimization Courses & Programs





MISSION:

# To Give You Agency With Your Sleep





MAKE SLEEP YOUR LENS

# Pyramid of Wellness.





# Sleep Is A Skill.

- It is the foundation of wellness
- It is **FAR More Than Just The Hours You Log**
- Depth, Quality, Duration, Efficiency, Regularity
- Behaviors, Environment, Mental state, etc.)



# Google Trends: A Cry For "Sleep Help"

Interest over time ?





POOR SLEEP

# Life Domains Impacted

- ❑ Cognitive and Brain Health
- ❑ Emotional and Mental Health
- ❑ Physical Health and Immunity
- ❑ Metabolic Health
- ❑ Cardiovascular Health
- ❑ Growth and Development
- ❑ Reproductive Health
- ❑ Pain Perception
- ❑ Aging
- ❑ AND MORE!!



# The Stats: Women & Sleep

- **Insomnia:** Approximately 1 in 4 women suffers from insomnia, making it more common in women than men (Source: NIH).
- **Sleep Deprivation:** About 1 in 3 women DO NOT GET the recommended seven hours of sleep per night (Source: CDC, 2016).
- **Sleep Apnea:** Up to 1 in 4 women in menopausal and post-menopausal stages may have sleep apnea. (Source: Valipour, 2012).



THE SOLUTION

# Circadian Rhythm Entrainment

Let Me Explain.

DEFINING

# Circadian Rhythm

24-hour cycle of physiological processes that our bodies undergo, driven by time-givers (known as zeitgebers) such as light exposure, temperature, and meal-timing.





IMPORTANCE

# Circadian Rhythm

Sleep - Digestion - Regeneration - Energy -  
Body Temperature - Melatonin - Cortisol -  
Growth Hormone - Insulin - Leptin - Ghrelin -  
Sex Hormones - Thyroid Hormones -  
Immune Function

SLEEP/WAKE

# Circadian Rhythm

As diurnal creatures, **we are meant to be active during the day, and at rest at night.**



## THE PROBLEM

# What Changed?

**We Went Indoors:** As of 2001, the EPA found that Americans spend around 93% of our days indoors, largely in climate controlled environments, and surrounded by manmade lighting comforts...with speculations that things have only gotten worse!

THE SOLUTION

# ReWilding





# The Camping Study

"WE DEMONSTRATE THAT EARLIER CIRCADIAN TIMING CAN BE RAPIDLY ACHIEVED THROUGH NATURAL LIGHT EXPOSURE DURING A WEEKEND SPENT CAMPING."

Stothard, E. R., McHill, A. W., Depner, C. M., Birks, B. R., Moehlman, T. M., Ritchie, H. K., Guzzetti, J. R., Chinoy, E. D., LeBourgeois, M. K., Axelsson, J., & Wright, K. P. Jr. (2017). Circadian Entrainment to the Natural Light-Dark Cycle across Seasons and the Weekend. *Current Biology*, 27(4), 508-513.

## Circadian Entrainment to the Natural Light-Dark Cycle across Seasons and the Weekend

Ellen R. Stothard,<sup>1,5</sup> Andrew W. McHill,<sup>1,5</sup> Christopher M. Depner,<sup>1</sup> Brian R. Birks,<sup>1</sup> Thomas M. Moehlman,<sup>1</sup> Hannah K. Ritchie,<sup>1</sup> Jacob R. Guzzetti,<sup>1</sup> Evan D. Chinoy,<sup>1</sup> Monique K. LeBourgeois,<sup>2</sup> John Axelsson,<sup>3,4</sup> and Kenneth P. Wright, Jr.<sup>1,6,\*</sup>

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<http://dx.doi.org/10.1016/j.cub.2016.12.041>

### SUMMARY

Reduced exposure to daytime sunlight and increased exposure to electrical lighting at night leads to late circadian and sleep timing [1–3]. We have previously shown that exposure to a natural summer 14 hr 40 min:9 hr 20 min light-dark cycle entrains the human circadian clock to solar time, such that the internal biological night begins near sunset and ends near sunrise [1]. Here we show that the beginning of the biological night and sleep occur earlier after a week's exposure to a natural winter 9 hr 20 min:14 hr 40 min light-dark cycle as compared to the modern electrical lighting environment. Further, we find that the human circadian clock is sensitive to seasonal changes in the natural light-dark cycle, showing an expansion of the biological night in winter compared to summer, akin to that seen in non-humans [4–8]. We also show that circadian and sleep timing occur earlier after spending a weekend camping in a summer 14 hr 39 min:9 hr 21 min natural light-dark cycle compared to a typical weekend in the modern environment. Weekend exposure to natural light was sufficient to achieve ~69% of the shift in circadian timing we previously reported after a week's exposure to natural light [1]. These findings provide evidence that the human circadian clock adapts to seasonal changes in the natural light-dark cycle and is timed later in the modern environment in both winter and summer. Further, we demonstrate that earlier circadian timing can be rapidly achieved through natural light exposure during a weekend spent camping.

### RESULTS AND DISCUSSION

substance abuse [11], mood disorders [12, 13], diabetes [14], and obesity [15, 16]. Contributing factors to late sleep timing include the period and phase of the circadian clock [17, 18], exposure to light at night [1, 19], circadian rhythm sleep-wake disorders [20], stimulant intake [21, 22], and work/school week versus weekend social schedules [23, 24]. As noted, we have shown that later circadian and sleep timing occur after exposure to the modern electrical lighting environment compared to the natural summer light-dark cycle [1]. Thereafter, others have reported later circadian and/or sleep timing in Brazilian rubber tappers [2] and in hunter-gatherers from the indigenous Toba/Qom in the Argentinean Chaco with access to electrical lighting compared to those from the same communities without access to electrical lighting [3]. Beyond the studies noted above, little is known about the impact of exposure to the combination of electrical and natural lighting in our modern world, henceforth referred to as modern electrical lighting, in comparison with exposure to only the natural light-dark cycle on the human circadian clock and sleep. Some unexplored questions include how the human circadian clock responds to seasonal changes in the natural light-dark cycle in the absence of electrical lighting, as well as how quickly the timing of the clock changes in response to the natural summer light-dark cycle. To begin to address these questions, we conducted two studies: the first aimed to quantify the impact of a week-long exposure to the natural winter light-dark cycle compared to exposure to modern electrical lighting on the timing of the human circadian clock; the second aimed to quantify the circadian response to a weekend of exposure to the natural summer light-dark cycle.

### Study 1: Winter Week-Long Camping

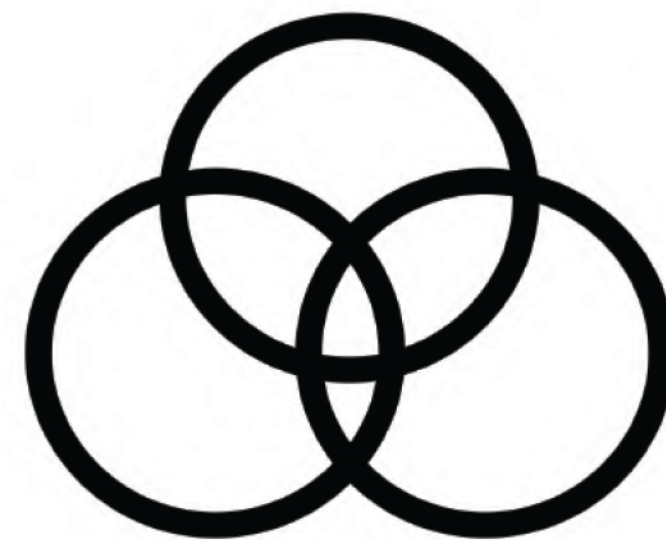
Five physically active individuals (four males, one female) aged 30.4 ± 8.6 years (mean ± SD) participated in a 2-week-long protocol (Figure S1A) near the winter solstice during December in Colorado, USA, between latitudes ~40°N and ~41°N and longitudes ~105.0°W and ~105.5°W. The melatonin rhythm—the most precise marker of internal biological time—was first assessed in the laboratory after 6 days of participants maintain-



## THE PROBLEM

# Aligning With Nature (Re-Wilding) = Circadian Rhythm Entrainment

Entrainment is the synchronization or alignment of the internal biological clock rhythm → to external time cues (called zeitgebers).





THE INFLUENCERS

# Circadian Rhythm Modulators: Light, Temperature, Meal Timing



zeitgebers → time-givers

ZEITGEBER #1

# Circadian Light/Dark Timing

DAY

NIGHT





ZEITGEBER #1

# Circadian Light/Dark Tools

- **APPS:** LUX/LIGHT METER, CIRCADIAN, & DMINDER
- **SUNLIGHT VIEWING:** OUTDOORS AND FREQUENT (ESP SUNRISE/SUNSET)
- **BLUE BLOCKERS:** DAY = YELLOW LENS, NIGHT = AMBER/RED LENS
- **RED LIGHT BULBS:** MOTION RED LIGHTS/RED BULBS
- **RED SCREENS:** IRISTECH.CO, COLOR FILTERS, TWILIGHT APP (ANDROID)
- **TIMED LIGHTING:** AUTO-TIMERS FOR CIRCADIAN TIMED LIGHTING
- **VITAMIN D FROM LIGHT:** CHROMA OR SPERTI

ZEITGEBER #2

# Circadian Temperature Timing

DAY

NIGHT



ZEITGEBER #2

# Circadian Temperature Tools

- **APPS:** NATURAL CYCLES (WOMEN), OURA, & WHOOP
- **SMART THERMOSTATS:** WARMER DAYS & COOLER NIGHTS (60-67 F)
- **COOLING BEDS:** SLEEPME & EIGHT SLEEP
- **MORNING COLD EXPOSURE:** PARADOXICAL WARMING EFFECT
- **EVENING HEAT EXPOSURE:** PARADOXICAL COOLING EFFECT
- **CHRONOPHARMACOLOGY:** HEAT-PROMOTING DRUGS (EX. ALCOHOL) VS. COOLING DRUGS (EX. MAGNESIUM)

ZEITGEBER #3

# Circadian Meal Timing

DAY

NIGHT



ZEITGEBER #3

# Circadian Meal Tools

- **APPS:** ONTIME HEALTH APP, CIRCADIAN APP, ZERO APP, NATURAL CYCLES
- **OPTIMAL:** 'FIRST BITE & LAST BITE' DURING SUNLIGHT HOURS (IMPACTS CORTISOL, MELATONIN, GLUCOSE/INSULIN, & SLEEP FRAGMENTATION -)
- **FIRST BITE:** 1 HOUR AFTER WAKING WITHIN SUNLIGHT HOURS
- **LAST BITE:** 2-3 HOURS BEFORE BED (EVIDENCE EMERGING FOR 4-5+ HOURS)
- **CONTINUOUS GLUCOSE MONITORS:** VERI, LEVELS, NUTRISENSE, & SIGNOS

PRACTICE TODAY

## Key Takeaways

- **Circadian Health (As A Lifestyle!):** Realize the pivotal role of circadian rhythms in our sleep/wake cycle, and the need to respect our inherent diurnal (day / night) nature.
- **The Indoor Issue:** Acknowledge that modern indoor lifestyles can disrupt our natural circadian rhythms and impede sleep health.
- **Embrace Nature:** Be open to natural interventions (remember the camping study!) and how spending time outdoors to help reset our circadian rhythm.
- **Implement Strategies:** Utilize the three primary zeitgebers - light timing, temperature timing, and meal timing - to entrain your circadian rhythm and optimize your sleep.



# Thank You!

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