Access to Electric Light Is Associated with Shorter Sleep Duration in Toba Communities of The Argentinean Chaco

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Components of Mammalian Circadian System

- Environmental Cycle (e.g., light-dark cycle)
- Photoreceptors (retina)
- Clock (suprachiasmatic nucleus)
- Overt circadian rhythms (e.g., sleep-wake cycle)
Flying squirrels can be entrained by one second of light per day.

The circadian system is highly sensitive to light resetting.

One second!
The human circadian system can be reset by artificial light

Dose–response relationships for resetting of human circadian clock by light


NeuroReport 9, 779–782 (1998)

Resetting of circadian melatonin and cortisol rhythms in humans by ordinary room light

Diane B. Boivin1 and Charles A. CzeislerCA
Could our ancestral sleep timing have changed by the access to artificial light, particularly electric light?
The Toba

Latitude: 23° 47min
Longitude: 61° 48min
Activity data loggers
November (summer)

Locomotor activity

Clock time

Sunset

Sunrise
November (summer)

Time in bed
Sleep duration

Time in bed
Sleep duration

Bedtime
Sleep onset
Sleep offset
Rise time

* Time in bed
Sleep duration

† Electricity
NO-electricity

Clock time
1300 1700 2200 0300 0800
August (winter)
August (winter)

- **Bedtime**
- **Rise time**
- **Sleep onset**
- **Sleep offset**

- **Time in bed**
- **Sleep duration**

Clock time:
- 1300
- 1700
- 2200
- 0300
- 0800

- **NO-electricity**
- **Electricity**

* and † symbols may represent specific conditions or notes.
NO-electricity

<table>
<thead>
<tr>
<th>Time in bed</th>
<th>Sleep duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td>2200</td>
</tr>
<tr>
<td>0300</td>
<td>0800</td>
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</table>

Clock time
Acknowledgments

The Toba communities of Sombrero Negro and Barrio Qompi. Thank you for your friendship!