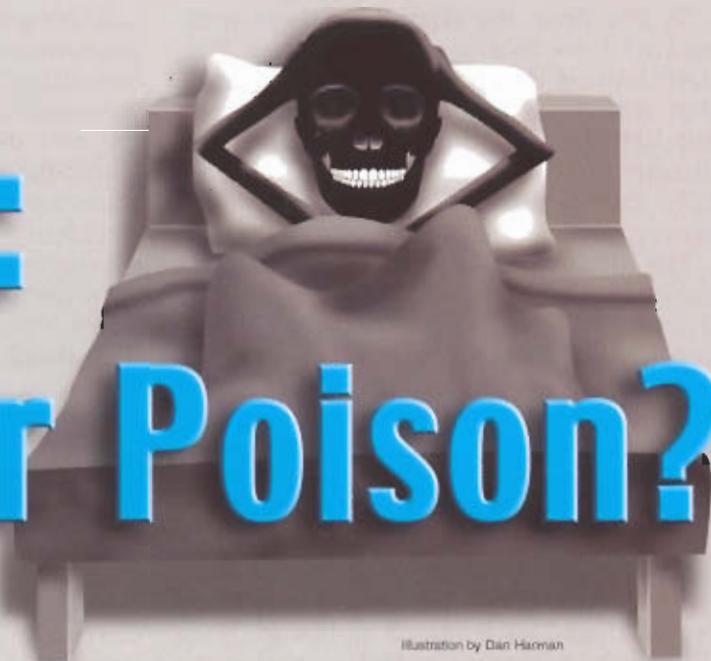


Napping: Power or Poison?



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During times when aviators are working around the clock trying to meet deployment deadlines and trying to accomplish the mission, sleep becomes difficult to obtain. The will to work is strong, but the body's ability to follow that will weakens with each hour spent awake. Ultimately, the fatigue from lack of sleep can become so powerful that concentration, motivation and performance are seriously impaired. How important is it to get enough sleep, and how much sleep does it take to really make a difference? Is it enough to take naps when long sleep periods aren't possible or is this just a waste of time?

Unfortunately, information about the importance of sleep may be confusing at best, and contradictory at worst. This is especially true of napping. Some people say, "If you can't sleep at least two hours, then don't sleep at all," and others say, "I feel worse after waking from a nap, so naps just don't work for me." Still others insist, "All sleep is important, so get as much as possible." Which, if any, of these statements is correct? There may be some truth to each, but as they say, "The devil is in the details," so issues surrounding sleep and especially naps deserve explanation. Here is a summary of what researchers know about napping during otherwise continuous hours of prolonged wakefulness.

The Power Of Naps

There is an abundance of evidence that a nap taken during long periods of otherwise continuous wakefulness (such as during shift rotations) is

extremely beneficial for improving alertness and performance. Switching from a day shift to a night shift commonly causes sleep deprivation in a lot of people. For various reasons, many workers choose to stay awake throughout the day before reporting for a night shift, leading to at least 24 hours of wakefulness and all the ill effects of sleep deprivation. If a full sleep period is not possible before making this transition, a two- to three-hour nap before the night shift will definitely improve nighttime performance over what would occur without the nap. Although the usual circadian trough will still be noticeable in the early morning hours—the symptoms are excessive sleepiness, poor attention, etc.—the nap will attenuate these decrements compared to remaining awake continuously.

There are times other than transitioning to night shift when long hours of continuous wakefulness are experienced, preparing for deployment, participating in training exercises, and responding to emergencies, to name a few. In situations where a normal eight hours of sleep isn't possible, a nap can make a noticeable difference in performance, mood, and alertness. A nap taken *before* long periods of continuous wakefulness, called a "prophylactic nap," is beneficial for preventing decreases in performance and alertness compared to not taking a nap. If a significant sleep debt is not allowed to accumulate before getting some sleep, the positive effect from the nap will be readily apparent. However, a prophylactic nap's beneficial effects will wear off if a second night of continuous wakefulness occurs without additional sleep.

Sometimes a continuous work period is not expected and a prophylactic nap cannot be planned. In such situations, taking a nap whenever

it is convenient is better than trying to stay alert and productive for hours on end without sleep. During long periods of sleep deprivation (more than 36 hours), a nap of any duration, but preferably one that is as long as possible, is very beneficial. This nap, called a "replacement nap," will reduce the decline in performance during the subsequent work period. Of course, it is best to take a nap before significant sleep loss has occurred, but when this is not possible, a nap any time during the continuous wakefulness period will improve alertness, performance and mood compared to what would have occurred without any sleep.

The Poison Of Naps

It is well established that practically everyone experiences post-nap sleepiness, termed "sleep inertia," immediately upon awakening from a nap. This is why many people think naps aren't helpful, because they remember the immediate discomfort they feel right after they wake up rather than the long-term benefits from the extra sleep. Performance and mood generally are lowest during the first five minutes after awakening, but usually recover after 15 to 30 minutes. Generally, sleep inertia will be extended when naps are taken during the temperature minimum or trough (usually in the early morning hours) and/or the amount of sleep deprivation is extensive before the nap occurs. If sleep inertia is a major consideration (such as it would be if you didn't have time to become fully awake before performing a task), naps during the temperature trough should be avoided; however, it may be difficult to actually fall asleep during "non-trough" times. Sleep inertia also can be minimized by ensuring that naps are taken before 36 hours of continuous wakefulness. The easiest way to avoid sleep inertia and reap the greatest benefits from napping is to allow about an hour between nap-wake-up and work.

So What Do I Do?

Sleep is important and cannot be avoided indefinitely. At some point, the body will shut down and sleep, regardless of the situation. So, making sure personnel can sleep at least a short while should be a high priority for the sake of performance, safety, and morale. However, scheduling naps is not a simple matter. In order to make napping an asset rather than a problem, several factors should be considered.

Nap timing. One important factor in scheduling naps is placing them at optimal times with regard to the amount of sleep loss. A nap taken during the day before an all-night work shift (a prophylactic nap), with no sleep loss prior to the shift will result in improved performance over the night compared to performance without the nap. Although naps taken later in the sleep-deprivation period also are beneficial, these naps probably should be longer

than prophylactic naps in order to derive the same performance benefit.

Nap length. Another factor to consider when scheduling naps during continuous operations is nap length. Most studies indicate that naps of at least one hour will improve performance and alertness, but there is a relationship between nap length and performance — the longer the nap, the longer the beneficial effects on performance and mood. The conclusion from research is that a nap should be as long as possible to produce maximum performance benefits. However, any sleep obtained during a long work period is better than no sleep at all, especially if time can be given to recover from sleep inertia.

Nap placement. Another factor to consider when planning a napping strategy for use during continuous operations is where the nap should be placed in the 24-hour day. Nap timing should take into account the ease of falling asleep at various times, the quality of sleep as a function of the body's internal clock, and the effects on performance both immediately after awakening and later in the work period. Sleep tendency is highest when core body temperature is in its trough (in the early morning hours) and lowest when core body temperature is in its peak (in the early evening hours). Thus, there may be significant problems initiating and/or maintaining naps during times when core temperature is high, termed the "forbidden zone" for sleep. Naps placed at times when body temperature is low are the easiest to maintain, and they show beneficial effects on later performance. However, sleep inertia is highest following these naps. While both naps have been shown to improve performance measured later in the day compared to after no sleep at all, the nap taken in the temperature trough offered the most benefit. But remember, a nap taken *anywhere* in the 24-hour cycle before sleep deprivation is better than no nap at all.

The Bottom Line

In summary, naps of any length are beneficial for reducing sleepiness and performance decrements during sleep-deprivation periods. The longer the nap, the longer the benefit will be. A nap is most beneficial if taken before significant sleep loss occurs, if it is as long as possible, and if it is placed in the temperature trough (provided there is time to recover from sleep inertia). If choosing between no sleep at all and a nap of any length, generally the choice should be a nap, but remember to allow time for sleep inertia to dissipate before returning to the job.③

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