SHORT NOTE

# Tiredness Versus Sleepiness: Semantics or a Target For Public Education?

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FOR MANY YEARS, VIRTUALLY EVERYONE IN THE SLEEP MEDICINE FIELD has been aware of the incongruence of individuals' denial of subjective daytime sleepiness, as opposed to other indicators, such as Multiple Sleep Latency Test results; reports of tiredness, fatigue, or lack of energy; or frequent unintentional sleep episodes.[1,2] This incongruence has been explained in a number of ways. Some claim that people do not experience themselves as sleepy because it has been years since they experienced adequate restorative sleep. That is, they have habituated to an existence wherein physiologic sleepiness during wakefulness is constantly high and the experience of sustained alertness has long been forgotten. For example, the scenario of a patient with untreated sleep apnea who, upon questioning, denies feeling sleepy but was sleeping in the exam room and has fallen asleep at the wheel on a few occasions during the past month is a common experience of sleep medicine physicians. Some propose that such individuals simply do not remember what it is like to be "wide awake and alert."

Others assert that *sleepiness* is not perceived because of physical and mental activities that mask or distract us from experiencing our current degree of sleepiness.[3] One of us (WCD) has questioned 1,235 high-school students, an age group widely acknowledged to have a substantial sleep debt, "How do you feel right now?" The response choices were *wide awake and alert*, *tired*, *very tired*, and *sleepy*. Asked at the beginning of lectures, 82.5% answered *tired* or *very tired*, but only 6% reported *sleepy*. When the question was repeated in the middle of the lecture and again toward the end of the lecture, the numbers invariably shifted, with the percentage of students endorsing *sleepy* being 25.3% and 48.7% at these time points, respectively. The hypothesis, of course, would be that as the students spent more time with limited physical activity and reduced opportunity for social interaction, the awareness of the *need for sleep* was unmasked or recognized.

Another hypothesis to explain the incongruence between the report of sleepiness and other indicators of increased sleep drive involves a more semantic explanation. This viewpoint holds that the unwillingness of some to describe their subjective state as *sleepy* is because of the perception that *need for sleep* is a sign of personal weakness, or a lack of initiative or resolve. On the other hand, to describe oneself as *tired* is more acceptable because it is perceived to be the result of effort or hard work, the antithesis of what is judged to be the source of sleepiness. Might this explain, at least in part, references in the medical literature indicating that tiredness and fatigue are very common patient complaints, whereas there are rather rare references to sleepiness?

There is also a line of thought that the neurophysiologic processes of sleepiness do not produce a subjective sensation that is identified or associated with a need for sleep or a state approaching sleep until that neural drive is substantial. In other words, people do not describe themselves as *sleepy* when the neural drive to sleep is mild or moderate because they do not recognize the subjective indications or do not attribute those indications to the need for sleep. To the degree that this hypothesis is correct, education about sleep drive, sleep debt, and the sleepiness-alertness continuum should make us better introspective judges of our physiologic state.

Whatever the exact reason or reasons for the incongruence discussed above, we hypothesize that terms such as *tired* and *tiredness* are often used within the American lexicon to refer to a physiologic state of *increased need for sleep* that is below the experiential threshold for subjective sleepiness. That is, a person is aware of a suboptimal feeling, without frank sleepiness, which they characterize as *tiredness* but do not often associate with inadequate sleep. In order for individuals to say that they are *tired* but not *sleepy*, they must have some internal criterion. A question has been administered and possible responses have been obtained (shown in Table 1) by one of us (WCD) to approximately 5,000 people, predominantly college students, to obtain some insight into the internal criteria used.

The question posed was "Which of the items listed would you associate with feeling drowsy?" (Earlier discussions indicated that most people believe *drowsy* and *sleepy* to be synonyms). Of the 20 possible responses, covering a variety of physical or psychological cues or indications of drowsiness, sensations involving the eyes and eyelids were selected by nearly 90% of the respondents. A smaller sample was asked the same question with the exception that *drowsy* was replaced by *sleepy* and the results were identical. From these results, we might presume that if someone reported feeling *very tired*, but not *sleepy* or *drowsy*, sensations involving the eyes and eyelids would not be present. Conversely, awareness of heavy eyelids or difficulty keeping the eyes open may be the most common cue for the subjective onset of sleepiness.

The 2001 "Sleep in America" survey[4] conducted by the National Sleep Foundation provided an opportunity to explore the relationship between the experience of *tiredness* and several factors known to be related to increased sleepiness. The participants—1010 adults (50% male), aged 18 years or older—were selected from a random sample of telephone numbers, with quotas for region of the country based upon United States census data. The maximum sampling error was $\pm$ 3.1% at a 95% level of confidence.

The relationship between the experience of *tiredness* and *sleep* or *sleepiness* was not directly addressed with the participants. Rather, respondents were asked a number of questions about their sleep behaviors and sleep disorders, as well as a number of other health and lifestyle questions. One of those items was "Thinking about a typical day, please rate how you have generally felt on a scale from 1 to 5, where 1 means '*tired*' and 5 means '*full of energy*.' The responses to that question were then examined in conjunction with responses to questions about sleep. Figure 1 presents the relationship between "tiredness" ratings and usual number of hours slept on work days. The percent reporting that they are *tired* on a typical day (answer of 1 or 2 on the 5-point scale) doubles as the usual number of hours slept decreases, from 14.8% to 31.8%.

Ratings of usual sleep quality and ratings of tiredness are also related.

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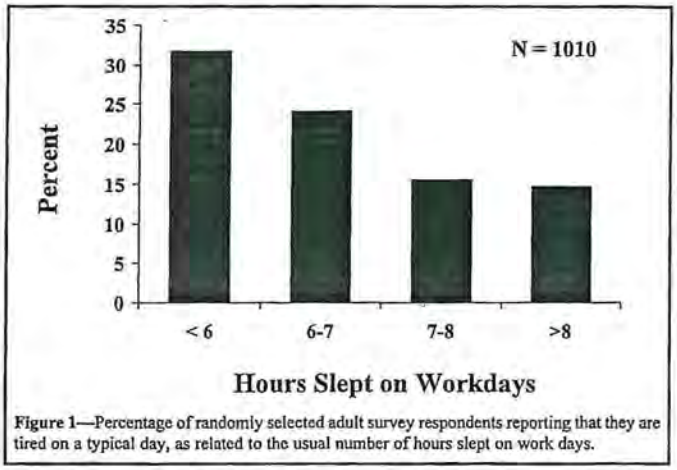


**Figure 1**—Percentage of randomly selected adult survey respondents reporting that they are tired on a typical day, as related to the usual number of hours slept on work days.

The percentage of respondents reporting *fair* or *poor* sleep quality are approximately 5 times (44%) more likely than those with *good, very good,* or *excellent* sleep (8%) to report that they are tired on a typical day.

Comparison of the reported frequency of "sleepiness which interferes with daily activities" with the ratings of tiredness on a typical day, reveals a positive relationship. A much higher percentage of respondents with sleepiness at least *a few days per week* (43%) or *a few days per month* (34%) report being tired on a typical day, as compared to those stating that they were *rarely* or *never* sleepy (12%) during the day.

These preliminary data suggest that the subjective experience of tiredness is often caused by relatively short nightly sleep durations and poor sleep quality. Additionally, individuals who more frequently experience daytime sleepiness are more likely to feel tired on a typical day. We believe that these associations suggest that a sensation of, or expression of *tiredness* may often, although not always, reflect an increased sleep drive, either at a premorbid level relative to the actual experience of significant sleepiness or that is sufficiently masked by a stimulating environment.

From a clinical perspective, reports of persistent tiredness, even in the absence of evidence of sleepiness, may be a symptom of a sleep disorder or insufficient sleep. Female patients with sleep apnea, for example, are more likely to complain of fatigue, whereas males report more sleepiness.[5] Additionally, measures of sleepiness are significantly associated with the energy/fatigue domain on the SF-36® Health Survey.[6] Waiting until problem sleepiness is unequivocal may delay necessary treatment and may prolong a suboptimal quality of life. A top priority for physicians when patients complain of tiredness or fatigue is to first consider inadequate or unhealthy sleep.

From a public health perspective, substantial numbers of people tired as a result of poor sleep but, misattributing their symptoms to chronic fatigue syndrome, depression, etc., may pursue or be directed to inappropriate remedies. Moreover, in some instances a *tired* individual getting behind the wheel, without awareness of any sleepiness, may be just minutes away from progressing to being a dangerously sleepy driver.

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## REFERENCES

1. Benbadis SR, Mascha E, Michael C, et al. Association between the Epworth Sleepiness Scale and the multiple sleep latency test in a clinical population. Ann Intern Med 1999;130:289-92.
2. Wiggins CL, Schmidt-Nowara WW, Coultas DB, Samet JM. Comparison of self and spouse reports of snoring and other symptoms associated with sleep apnea syndrome. Sleep 1990;13:245-52.
3. Carskadon MA, Dement WC. The multiple sleep latency test: what does it measure? Sleep 1982;5:S67-72.
4. National Sleep Foundation. 2002 Sleep in America Poll. Washington DC: National Sleep Foundation; 2002.
5. Redline S, Strohl KP. Recognition and consequences of obstructive sleep apnea hypopnea syndrome. Clin Chest Med 1998;19:1-19.
6. Briones B, Adams N, Strauss M, et al. Relationship between sleepiness and general health status. Sleep 1996;19:583–8.