# Free Communications: Abstract 1

## Objective vs subjective sleepiness: same difference?

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The occurrence of sleepiness during monotonous activities, with low sensory stimulation, is a common phenomenon. Dozing off in safety-critical conditions however, might present with potentially fatal consequences. Allegedly, accurate perception of sleepiness therefore serves as an organism's early sign for high levels of sleep propensity (Mairesse et al., 2014). The prevalence of sleepiness-related road, work and domestic accidents, suggests that humans may often fail to correctly determine how sleepy they are, or choose not to act upon these feelings. The former implies an inability to correctly interpret given stimuli, the latter implies no failure of the perceptual ability, but rather a conscious neglect. Although discrepancies between subjective and objective sleepiness have repeatedly been examined earlier, only very few studies have addressed these inconsistencies using an adequate methodology (Neu et al., 2010).

The purpose of this study is to evaluate the apparent divergence between objective and subjective sleepiness levels, within an Item-Response Theory framework. Twenty-two healthy participants aged between 18 and 47 years, enrolled in a 36-hour constant routine protocol. Every two hours, participants were asked to rate their subjective level of sleepiness by means of the Karolinska Sleepiness Scale (KSS) before performing a 20-min sleep latency recording in accordance with MSLT research procedures. KSS scores and sleep latencies underwent a Rasch-based calibration procedure, transforming raw scores/values into linear measures. Objective and subjective measures were subsequently equated through Common Person Linking (CPL), allowing us to determine –within error- whether participants subjectively over- or underestimate sleepiness levels.

Our results show that a 5-category KSS presents with improved measurement properties (rating scale functioning, item fit, reliability/validity testing, measurement invariance). In addition, our findings indicate that after Rasch-calibration/CPL, proposed MSLT-thresholds may require optimization, and that four unequally spaced categories better reflect increasing levels of sleep propensity. CPL revealed a general estimation bias for about 64% of the sample. Similar proportions of subjects present with respective over- or underestimation of sleepiness levels. Regarding time-dependent biases, most estimation errors tended to occur within the so-called post-lunch dip (day 1: 14:00; underestimation); during early morning hours (day 2: 4:00; overestimation) and at the final trial (day 2: 20:00; overestimation).

Taken together, our findings suggest that in general, most individuals make estimation errors, with around one third of participants underestimating sleepiness levels. Moreover, these types of errors more frequently occur when homeostatic pressure is high and circadian wake drive is still low.

**References :**

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