WE OFFER A SOMEWHAT BELATED COMMENT ON V\textsc{AN} D\textsc{ONGEN ET AL}’S SURVEY ON THE RELIABILITY OF SLEEP ELECTROENCEPHALOGRAM (EEG) MEASURES. In their paper, Van Dongen and coworkers reviewed the research implications of high within-subject stability (i.e., inter-night reliability) of sleep measures, including EEG measured by computer. They pointed out important research issues on which this evidence bears. However, their extensive review omitted 2 substantial studies specifically focused on the reliability of computer-measured sleep EEG frequencies. In the first, Tan et al\textsuperscript{2} reported remarkably high inter-night reliability of delta, sigma, and beta frequencies during non-rapid eye movement sleep, measured with both fast Fourier transform and period-amplitude analysis. Subjects were 10 males and 6 females (mean age = 20 years) who underwent 5 consecutive nights of baseline recording. Internight reliability coefficients in these frequency bands were approximately 0.9 for fast Fourier transform power and period-amplitude measures of wave amplitude and incidence. For all measures, the mean of nights 1 and 2 correlated at approximately 0.95 with the 5-night mean. Tan et al noted that differences in skull impedance and other extracerebral factors could produce consistent individual differences in EEG amplitude that might spuriously enhance internight reliability of amplitude-weighted EEG measures (fast Fourier transform power and related period-amplitude measures). However, they found equally high reliability for an amplitude-free measure (period-amplitude time in band), indicating that it is the brain electrical activity that is reliable. In agreement with Linkowski et al\textsuperscript{3}’s earlier suggestion based on visually scored sleep EEG, Tan et al proposed that non-rapid eye movement delta and other sleep EEG frequencies are individual traits that are heavily genetically determined.

In their second paper, Tan et al\textsuperscript{4} presented internight reliability data for sleep EEG in 19 young adults (mean age 22 years, 10 men) and 19 elderly normal adults (mean age 71 years, 8 men). This remains the most extensive study of this question. Subjects were studied for 4 nonconsecutive nights, a design that challenges internight reliability more strongly than does one using consecutive nights. Digitized EEG in both non-rapid eye movement and rapid eye movement sleep was analyzed in 26 frequency bands using the fast Fourier transform and period-amplitude modules of PASSPLUS (Delta Software). Separate non-rapid eye movement and rapid eye movement spectra for each computer measure were constructed. In both age groups, non-rapid eye movement and rapid eye movement spectral curves differed significantly. Both spectra were complex curves with highly significant linear, quadratic, and cubic components. Again, the EEG measures were highly consistent within subjects, so much so that the spectra for each measure were virtually superimposed when plotted for individual subjects. Tan et al again demonstrated high within-subject Pearson reliability coefficients (~0.8 - ~0.95) for each frequency band. In both age groups, mean values for each measure were also stable across these nonconsecutive nights. To our surprise, and contradicting a speculation by Van Dongen et al, EEG spectra in the elderly were at least as reliable as those in young adults. Tan et al proposed that “The high reliability of computer-measured sleep EEG traits found here obviously invites their genetic investigation.”\textsuperscript{1}[p1551] It is encouraging that Van Dongen and colleagues have recently undertaken such studies.\textsuperscript{5}

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