Table 1: Hurst exponent comparison

| | CTL | | MCI | | Mixed ANOVA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | NREM | REM | NREM | REM | Group | | Stage | | Group×Stage | |
| | Mean (SD) | Mean (SD) | Mean (SD) | Mean (SD) | F | p | F | p | F | p |
| Fp2 | 1.34 (0.15) | 1.29 (0.13) | 1.35 (0.11) | 1.42 (0.17) | 1.31 | 0.276 | 0.10 | 0.754 | 5.81 | **0.035** |
| Fp1 | 1.37 (0.15) | 1.29 (0.12) | 1.35 (0.12) | 1.40 (0.16) | 0.56 | 0.471 | 0.37 | 0.555 | 4.55 | 0.056 |
| F8 | 1.33 (0.16) | 1.29 (0.14) | 1.34 (0.19) | 1.41 (0.18) | 0.71 | 0.417 | 0.11 | 0.750 | 6.35 | **0.029** |
| F7 | 1.38 (0.21) | 1.31 (0.13) | 1.30 (0.11) | 1.41 (0.14) | 0.04 | 0.852 | 0.12 | 0.734 | 7.49 | **0.019** |
| F4 | 1.30 (0.19) | 1.24 (0.15) | 1.30 (0.12) | 1.36 (0.17) | 0.54 | 0.476 | 0.11 | 0.742 | 8.79 | **0.013** |
| F3 | 1.34 (0.21) | 1.25 (0.14) | 1.29 (0.12) | 1.30 (0.15) | 0.00 | 0.996 | 3.11 | 0.106 | 4.23 | 0.064 |
| T4 | 1.30 (0.12) | 1.27 (0.14) | 1.28 (0.12) | 1.37 (0.13) | 0.38 | 0.549 | 1.54 | 0.241 | 6.82 | **0.024** |
| T3 | 1.35 (0.20) | 1.24 (0.13) | 1.26 (0.13) | 1.30 (0.19) | 0.02 | 0.890 | 1.75 | 0.213 | 5.30 | **0.042** |
| C4 | 1.29 (0.17) | 1.22 (0.13) | 1.28 (0.10) | 1.30 (0.13) | 0.35 | 0.568 | 1.22 | 0.293 | 3.93 | 0.073 |
| C3 | 1.30 (0.15) | 1.24 (0.14) | 1.26 (0.13) | 1.26 (0.14) | 0.06 | 0.809 | 2.03 | 0.182 | 1.82 | 0.205 |
| T6 | 1.19 (0.26) | 1.11 (0.22) | 1.29 (0.14) | 1.25 (0.44) | 0.86 | 0.374 | 2.15 | 0.171 | 0.25 | 0.626 |
| T5 | 1.26 (0.13) | 1.22 (0.14) | 1.24 (0.12) | 1.30 (0.16) | 0.28 | 0.609 | 0.07 | 0.803 | 3.27 | 0.098 |
| P4 | 1.26 (0.17) | 1.18 (0.11) | 1.26 (0.12) | 1.26 (0.16) | 0.37 | 0.557 | 2.97 | 0.113 | 2.88 | 0.118 |
| P3 | 1.27 (0.17) | 1.19 (0.11) | 1.24 (0.11) | 1.25 (0.16) | 0.06 | 0.805 | 2.61 | 0.135 | 2.98 | 0.112 |
| O2 | 1.29 (0.13) | 1.19 (0.10) | 1.26 (0.10) | 1.26 (0.17) | 0.20 | 0.660 | 3.41 | 0.092 | 2.70 | 0.129 |
| O1 | 1.29 (0.13) | 1.20 (0.12) | 1.25 (0.12) | 1.23 (0.16) | 0.00 | 0.980 | 5.66 | **0.037** | 1.94 | 0.191 |
| FZ | 1.32 (0.15) | 1.25 (0.14) | 1.28 (0.12) | 1.29 (0.15) | 0.00 | 0.986 | 2.32 | 0.156 | 4.13 | 0.067 |
| CZ | 1.27 (0.13) | 1.24 (0.16) | 1.27 (0.12) | 1.28 (0.14) | 0.14 | 0.717 | 0.30 | 0.594 | 1.23 | 0.291 |
| PZ | 1.29 (0.21) | 1.19 (0.12) | 1.27 (0.11) | 1.24 (0.16) | 0.03 | 0.872 | 3.67 | 0.082 | 1.07 | 0.322 |
| LOG | 1.41 (0.18) | 1.41 (0.17) | 1.41 (0.09) | 1.56 (0.18) | 1.07 | 0.324 | 3.93 | 0.073 | 4.96 | **0.048** |
| ROG | 1.40 (0.16) | 1.37 (0.17) | 1.37 (0.12) | 1.51 (0.18) | 0.76 | 0.401 | 2.20 | 0.166 | 6.19 | **0.030** |
| EMG | 0.69 (0.38) | 0.71 (0.35) | 0.50 (0.12) | 0.73 (0.33) | 0.24 | 0.633 | 1.79 | 0.213 | 1.33 | 0.278 |
| Fp1-Fp2 | 1.31 (0.17) | 1.27 (0.14) | 1.35 (0.16) | 1.38 (0.17) | 0.87 | 0.371 | 0.11 | 0.747 | 1.24 | 0.290 |
| F7-F8 | 1.34 (0.20) | 1.29 (0.15) | 1.33 (0.23) | 1.41 (0.19) | 0.31 | 0.590 | 0.05 | 0.834 | 5.03 | **0.047** |
| F3-F4 | 1.28 (0.21) | 1.22 (0.16) | 1.27 (0.17) | 1.29 (0.15) | 0.08 | 0.786 | 0.86 | 0.373 | 2.87 | 0.118 |
| T3-T4 | 1.30 (0.18) | 1.25 (0.14) | 1.25 (0.16) | 1.31 (0.13) | 0.00 | 0.991 | 0.03 | 0.872 | 4.57 | 0.056 |
| C3-C4 | 1.26 (0.16) | 1.20 (0.16) | 1.23 (0.14) | 1.23 (0.11) | 0.00 | 0.990 | 2.08 | 0.177 | 1.73 | 0.216 |
| T5-T6 | 1.25 (0.13) | 1.20 (0.15) | 1.24 (0.17) | 1.28 (0.21) | 0.20 | 0.660 | 0.13 | 0.722 | 1.83 | 0.204 |
| P3-P4 | 1.21 (0.18) | 1.15 (0.15) | 1.21 (0.15) | 1.20 (0.13) | 0.08 | 0.776 | 1.86 | 0.199 | 1.16 | 0.305 |
| O1-O2 | 1.25 (0.13) | 1.17 (0.13) | 1.22 (0.15) | 1.20 (0.14) | 0.00 | 0.958 | 3.64 | 0.083 | 0.88 | 0.368 |
| LOG-ROG | 1.34 (0.18) | 1.32 (0.16) | 1.37 (0.14) | 1.47 (0.18) | 1.36 | 0.268 | 0.98 | 0.343 | 2.10 | 0.176 |
| Fp2-P4 | 1.27 (0.18) | 1.22 (0.15) | 1.26 (0.15) | 1.33 (0.17) | 0.32 | 0.583 | 0.17 | 0.685 | 7.22 | **0.021** |
| Fp1-P3 | 1.28 (0.17) | 1.23 (0.12) | 1.26 (0.15) | 1.31 (0.14) | 0.14 | 0.712 | 0.02 | 0.877 | 4.39 | 0.060 |
| O2-P4-T4 | 1.25 (0.14) | 1.22 (0.15) | 1.25 (0.16) | 1.27 (0.14) | 0.09 | 0.771 | 0.09 | 0.775 | 0.87 | 0.370 |
| O1-P3-T3 | 1.28 (0.16) | 1.21 (0.15) | 1.20 (0.15) | 1.21 (0.13) | 0.37 | 0.557 | 1.40 | 0.262 | 2.43 | 0.147 |

CTL, Control group; MCI, Mild Cognitive Impairment

| Author & year | Analysis employed | Differences with our study | Similarities with our study |
|---|---|---|---|
| Weiss et al. 2009 | To compute the Hurst Exponent: R/S statistics (rescaled adjusted range of Mandelbrot and Taqq, 1979) To compute the range of fractal spectra: Alfred Renyi Generalized Entropy. | Healty subjects only. The purpose of the study is to use fractal methods to classify sleep stages. | 'Very few' subjects in their study to validate data: ONLY 10. |
| Weiss et al. 2011 | Spearman's correlation analysis | This paper is a follow up of a previous work, using healty subjects and a correlation between Hurst exponent and range of fractal expectra to strengthen their previous results. Now they use 22 healty subjects. | The use of fractal analysis to emphysize known phenomena about human sleep, in this case by proving that fractal range is a better estimating measure for classifing sleep stages. |
| Ma et al. 2017 | Survey of results of the use of nonlinear methods for sleep EEG. MUST READ. | This article is a survey, not a research article as ours. | As a good survey, it includes citations of work where DFA is used. |
| Lee et al. 2004 | They used DFA | Similar research. | They calculated the Hurst exponent of recording of normal sleep stage of six healthy subjects against the Hurst exponent of six recordings of apnea from MIT/BIH polysomnography database. The scaling exponent of apnea was found to be lower than those of healthy subjects |
| Acharya U. et al. 2005 | They computed several parameters, including the Hurst exponent (but no through DFA) | Didn't use DFA | They worked out they analysis with ONLY eight EEG data from the sleep-EDF database from the PhysioBank, a data resource. |