

QEEG Database Selection

qEEG-Pro (qEEG-Pro B.V.)

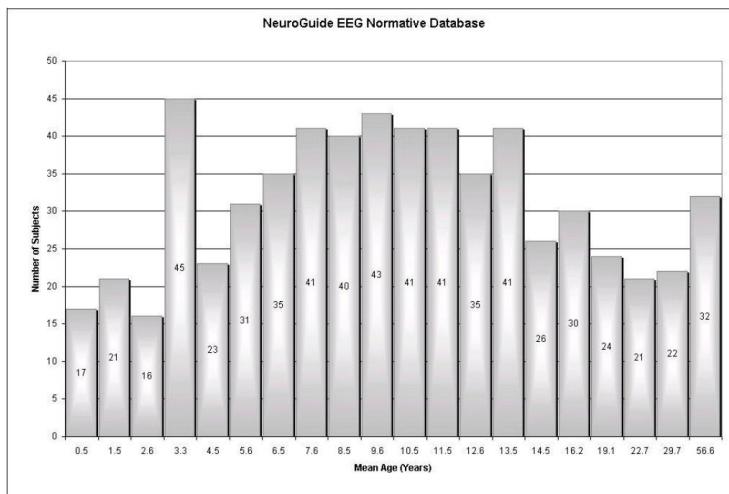
Neuroguide “Life Span EEG Database” (Applied Neuroscience, Inc)

BrainDX (BrainDX, L.L.C.)

HBI (HBImed AG)

Neuroguide

Neuroguide Database (Applied Neuroscience, Inc)



- Data collected: 1979-1987; 2000
- Total nr of subjects: 625
- Manual deartifacting
- Normals

www.appliedneuroscience.com

Sensitivity

+- 2 Standard Deviations
95,4%

+- 3 Standard Deviations
99,7%

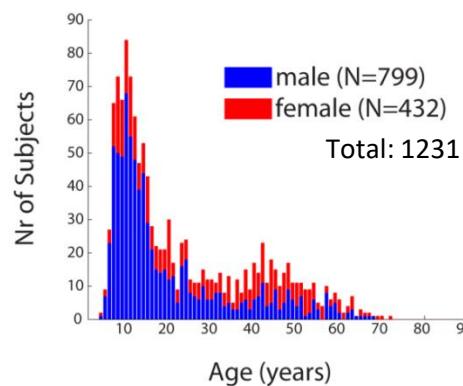
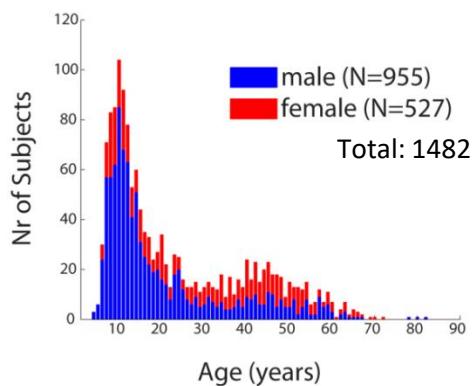
QEEG Database Selection

qEEG-Pro database (EEGprofessionals B.V.)

Eyes Closed



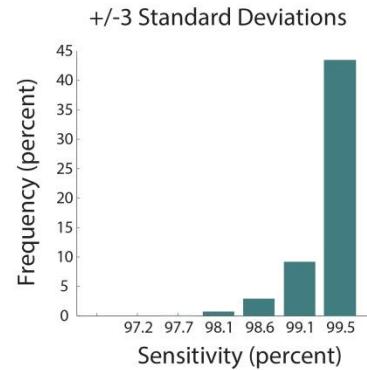
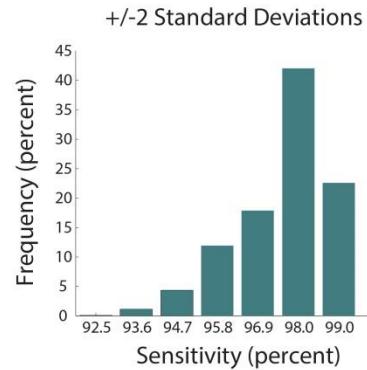
Eyes Open



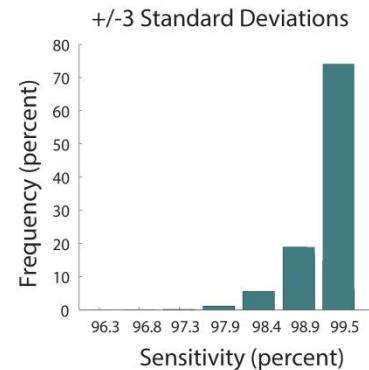
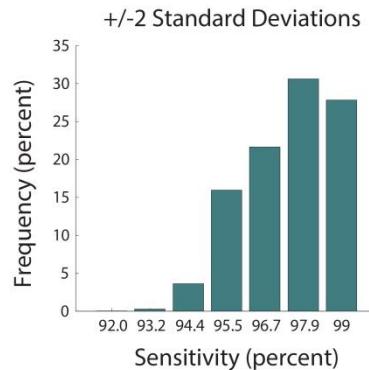
- Data collected: 2004-2013
- Total nr of subjects: 1482(EC) 1232 (EO)
- Automatic deartifacting
- Client-based

qeegpro.eegprofessionals.nl

Eyes Closed

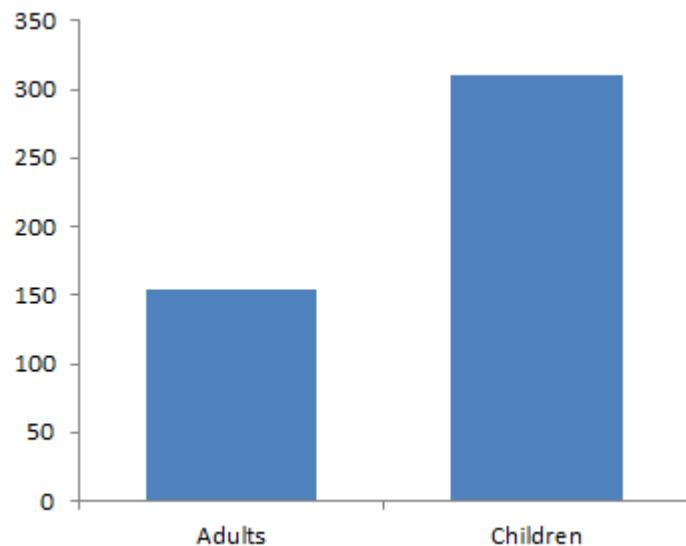


Eyes Open



QEEG Database Selection

BrainDX (BrainDX, L.L.C.)

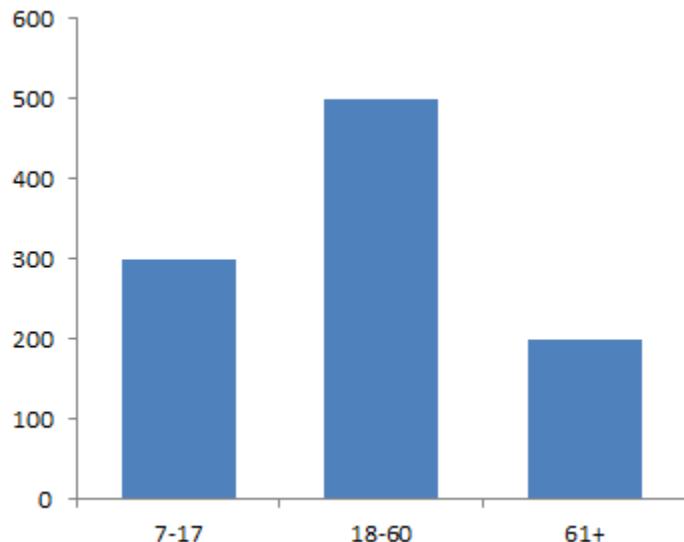


- Data collected: ~1970's-1980's
- Formerly NXLink – NYU
- Total nr of subjects: 464
- Manual deartifacting
- Normals

www.braindx.net

QEEG Database Selection

HBI database (HBImed AG)



- Data collected: ~1990's
- Total nr of subjects: 464
- Automatic deartifactual
- Normals

www.hbimed.com

Methods

- Three real EEGs:

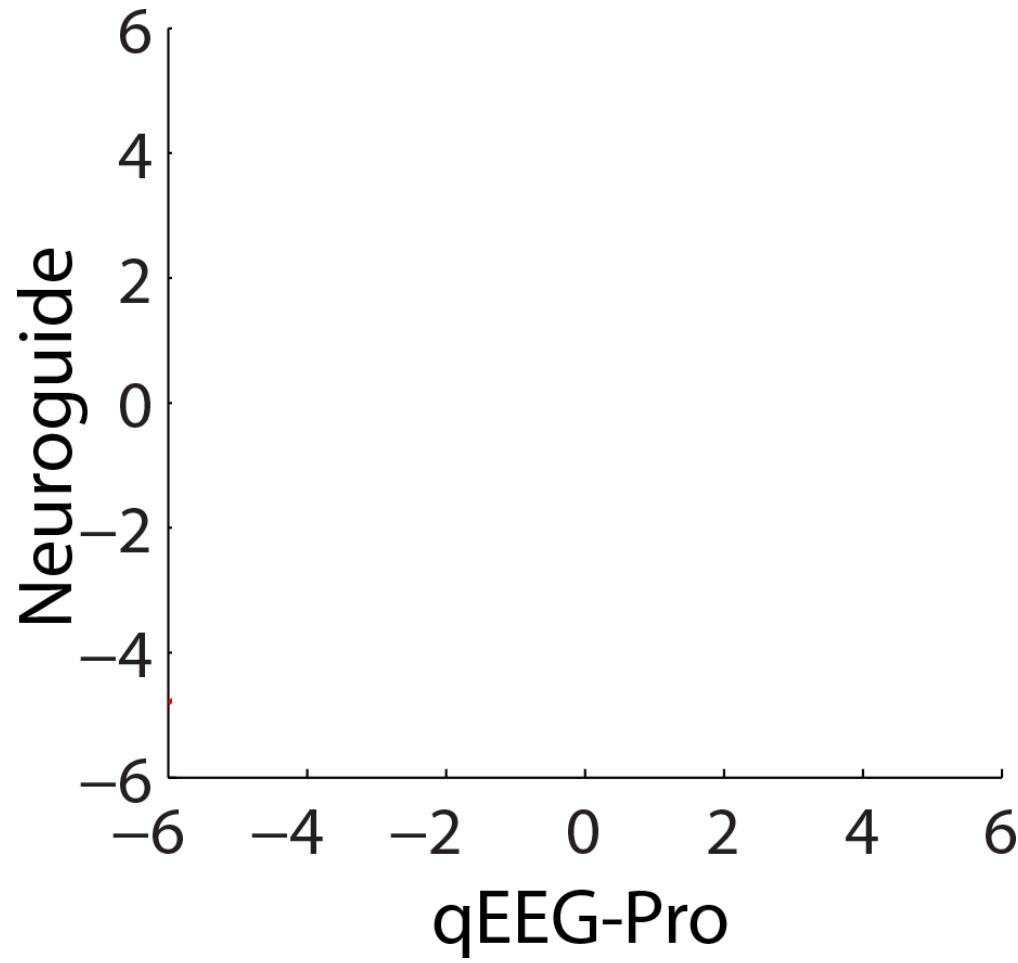
Subject 337822
Eyes Closed
Male
Age: 46

Subject 567795
Eyes Open
Female
Age: 48

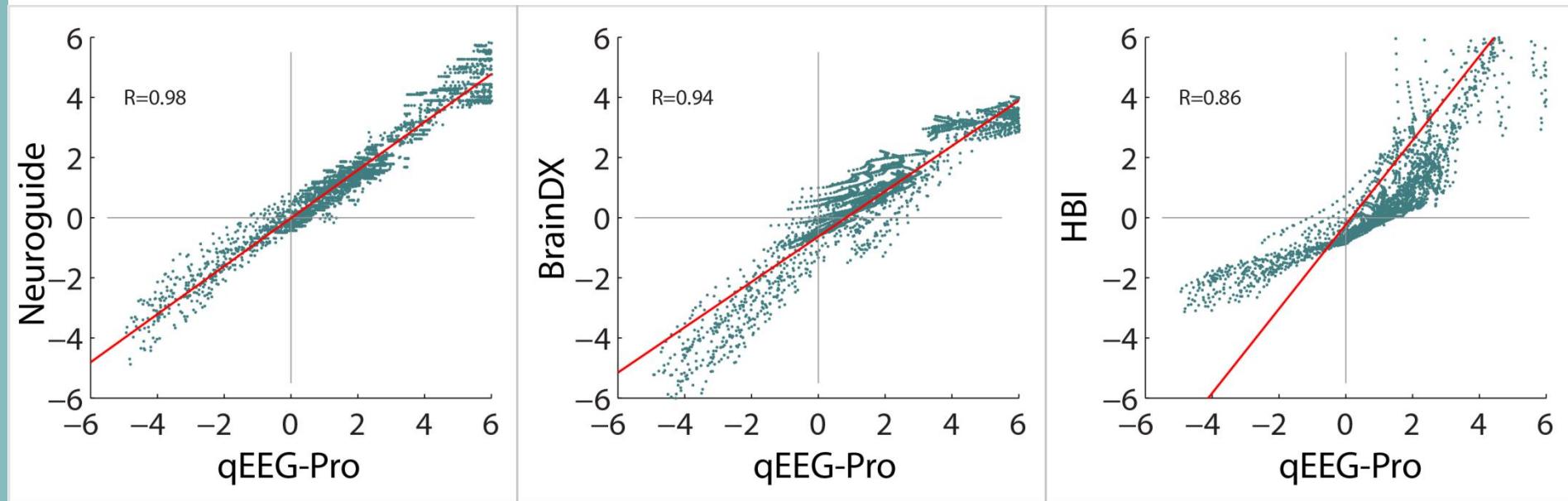
Subject 964666
Eyes Closed
Female
Age: 9

- ~9 minutes of EEG.
- Automatically deartifacted using (an old version of) S.A.R.A.
- Z-scores for absolute power
- ages 6-60, all frequency bins (30) and all electrodes (19)
 $3 \times 19 \times 55 \times 30 = \mathbf{94050}$ z-scores for qEEG-Pro, Neuroguide and HBI
- For BrainDX, only Delta, Theta, Alpha and Beta were available:
 $3 \times 19 \times 55 \times 4 = \mathbf{12540}$ z-scores.
- Focus on Eyes Closed

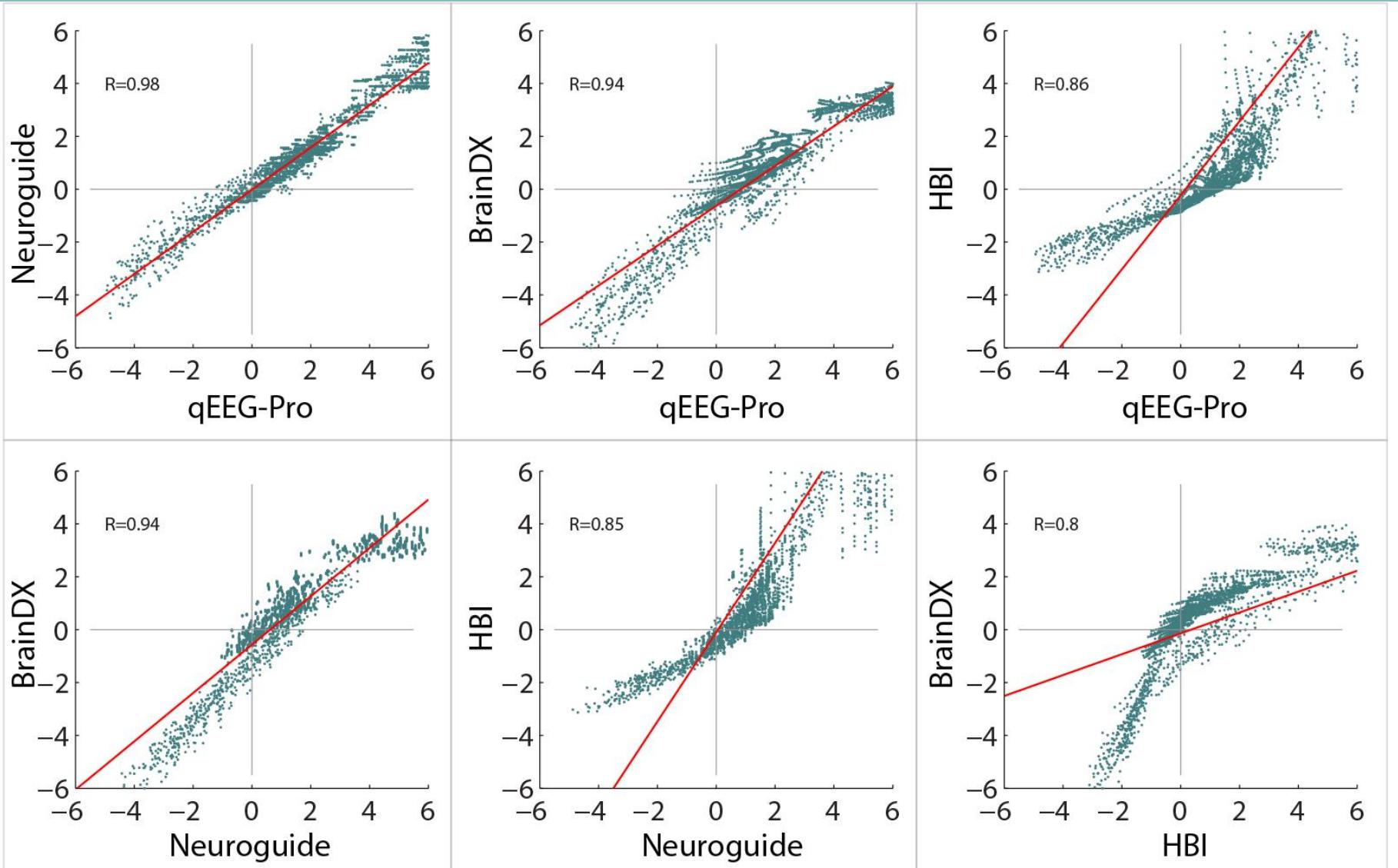
Z-score analyses – Delta (2-4Hz) –



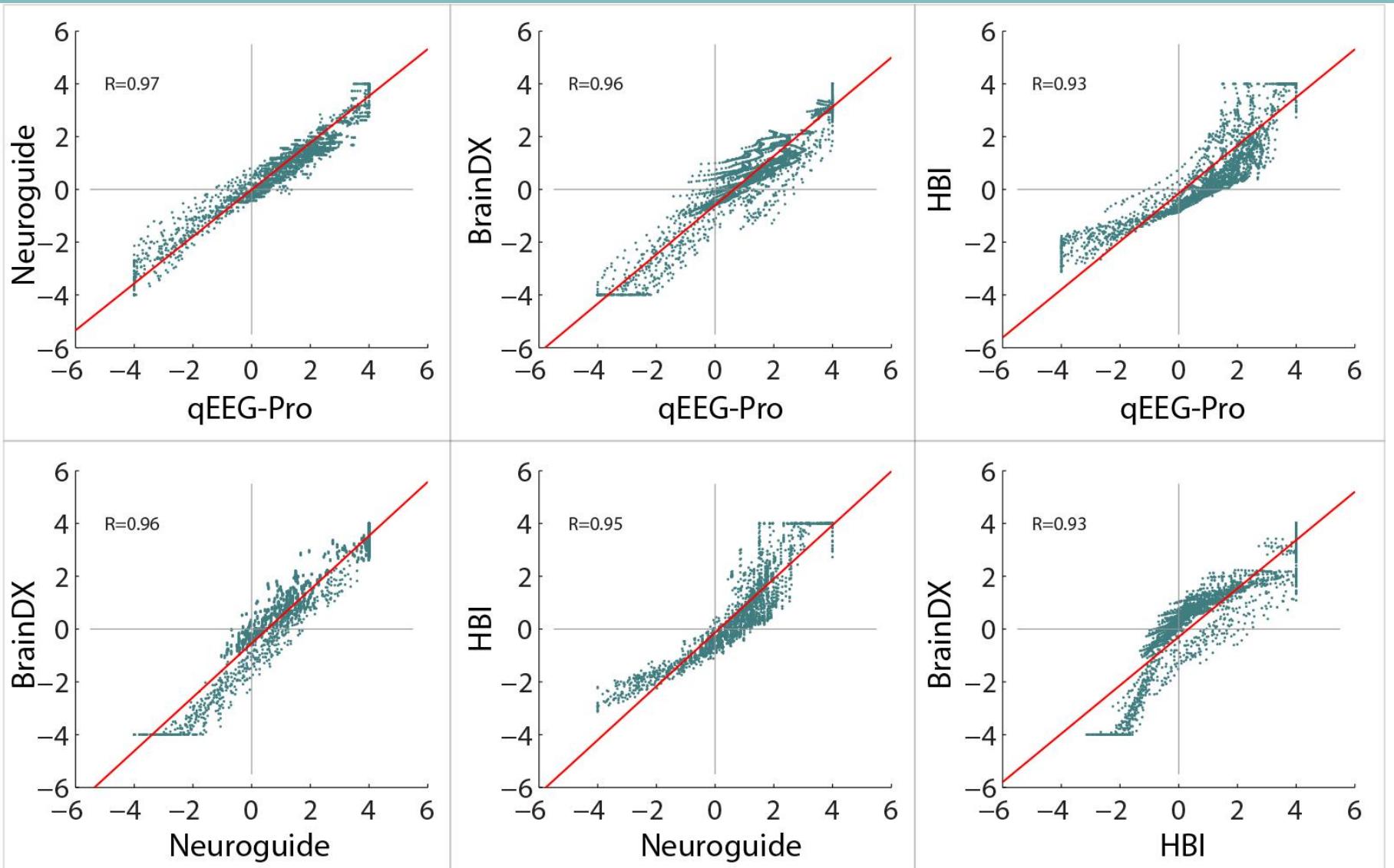
Z-score analyses – Delta (2-4Hz) –



Z-score analyses – Delta (2-4Hz) –



Delta (2-4Hz) – z-score is clipped at -4 and 4



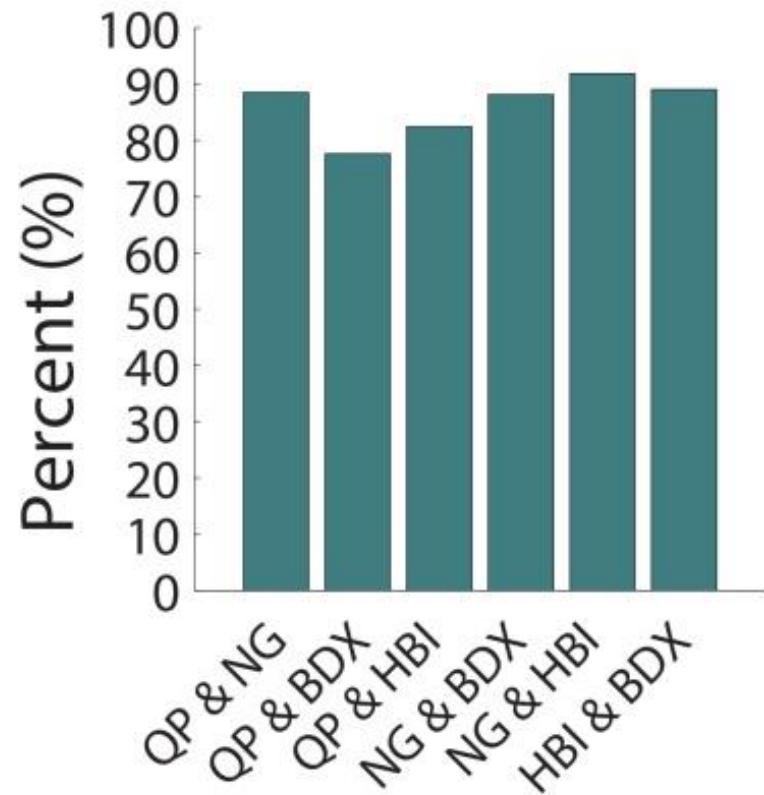
Z-score analyses – Delta (2-4Hz) –

'Database correspondence':

If the z-score in one database is greater than 2,
is the z-score in the other database greater
than 1.5?

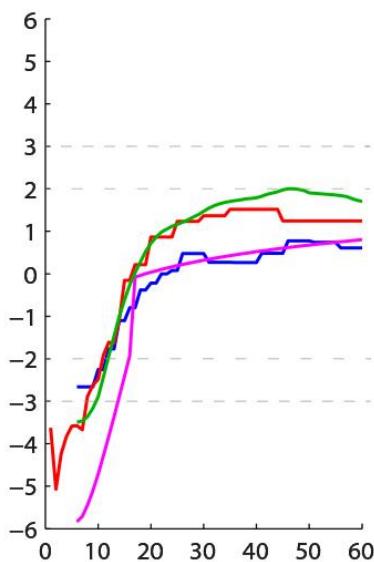
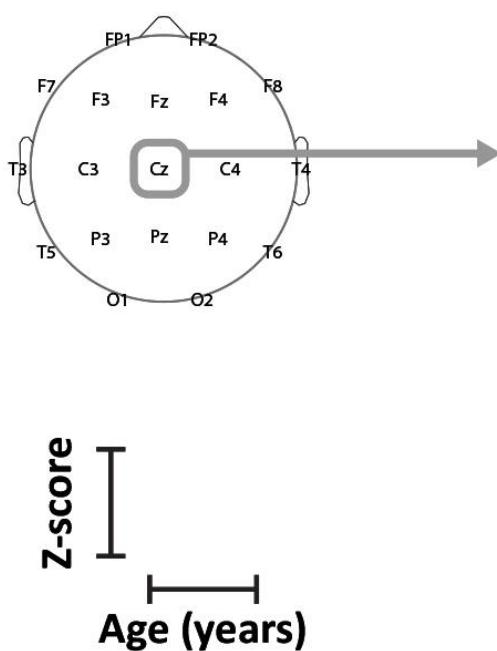
Same for z-scores smaller than -2?

Correspondence
Delta

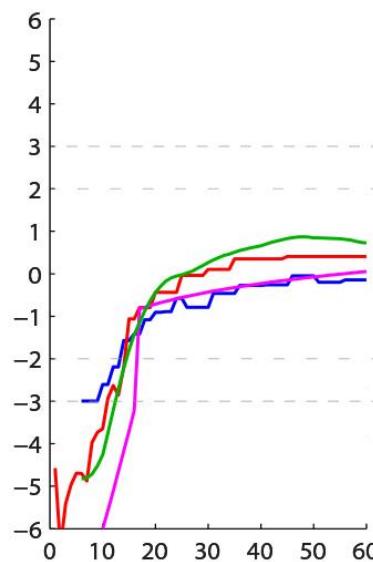


Z-score analyses – Delta (2-4Hz) –

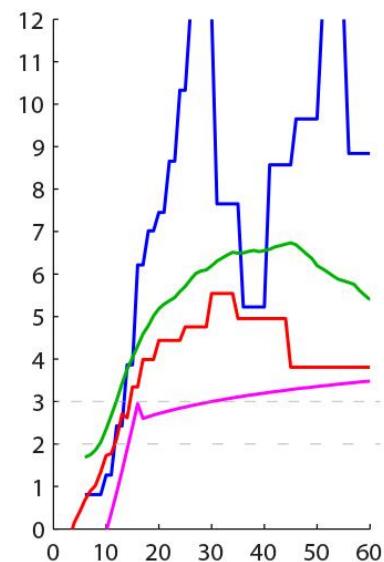
- qEEG-Pro
- Neuroguide
- HBI
- BrainDX



Subject 337822
Eyes Closed
Gender: Male
Age: 46.34

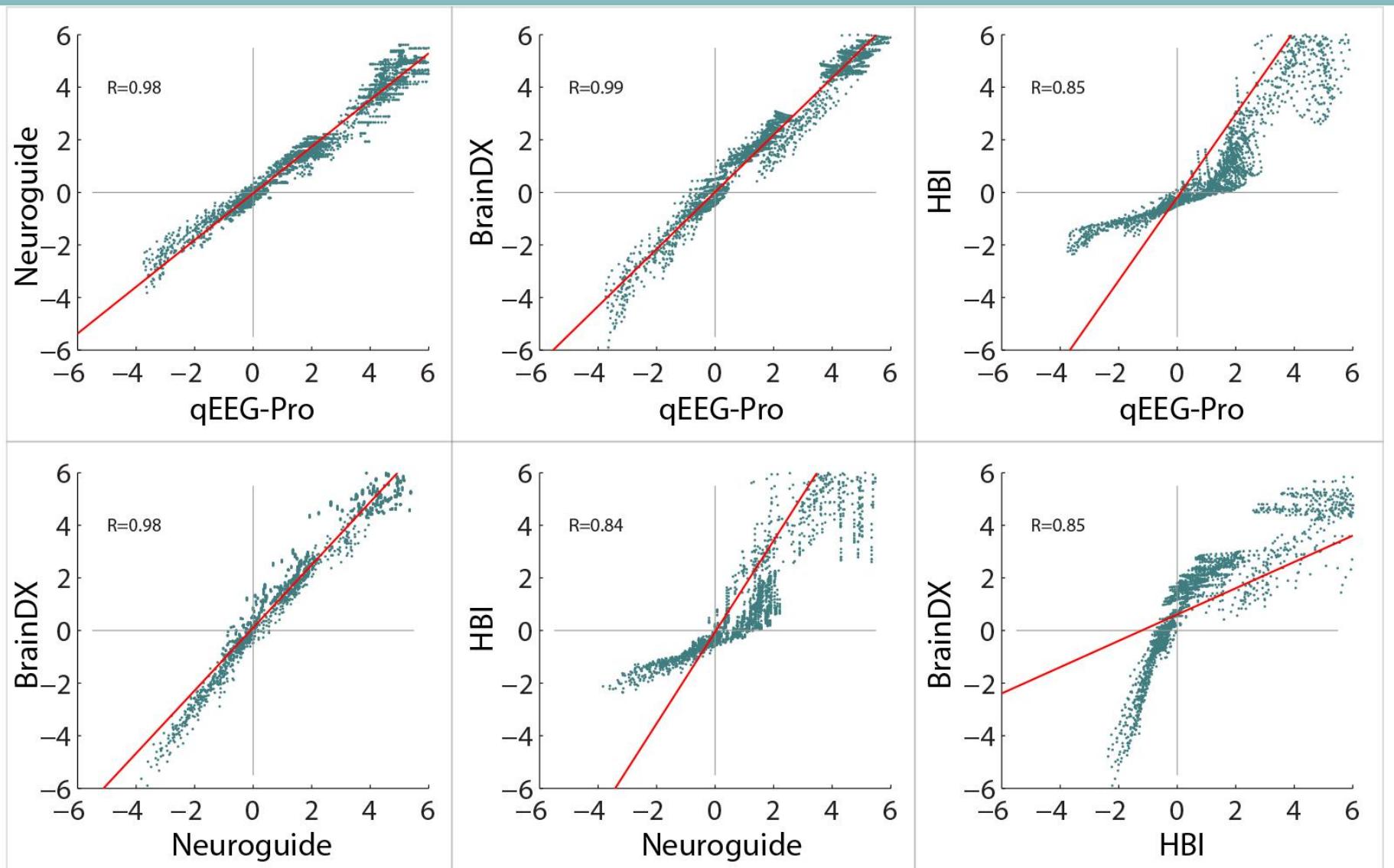


Subject 567795
Eyes Open
Gender: Female
Age: 47.92

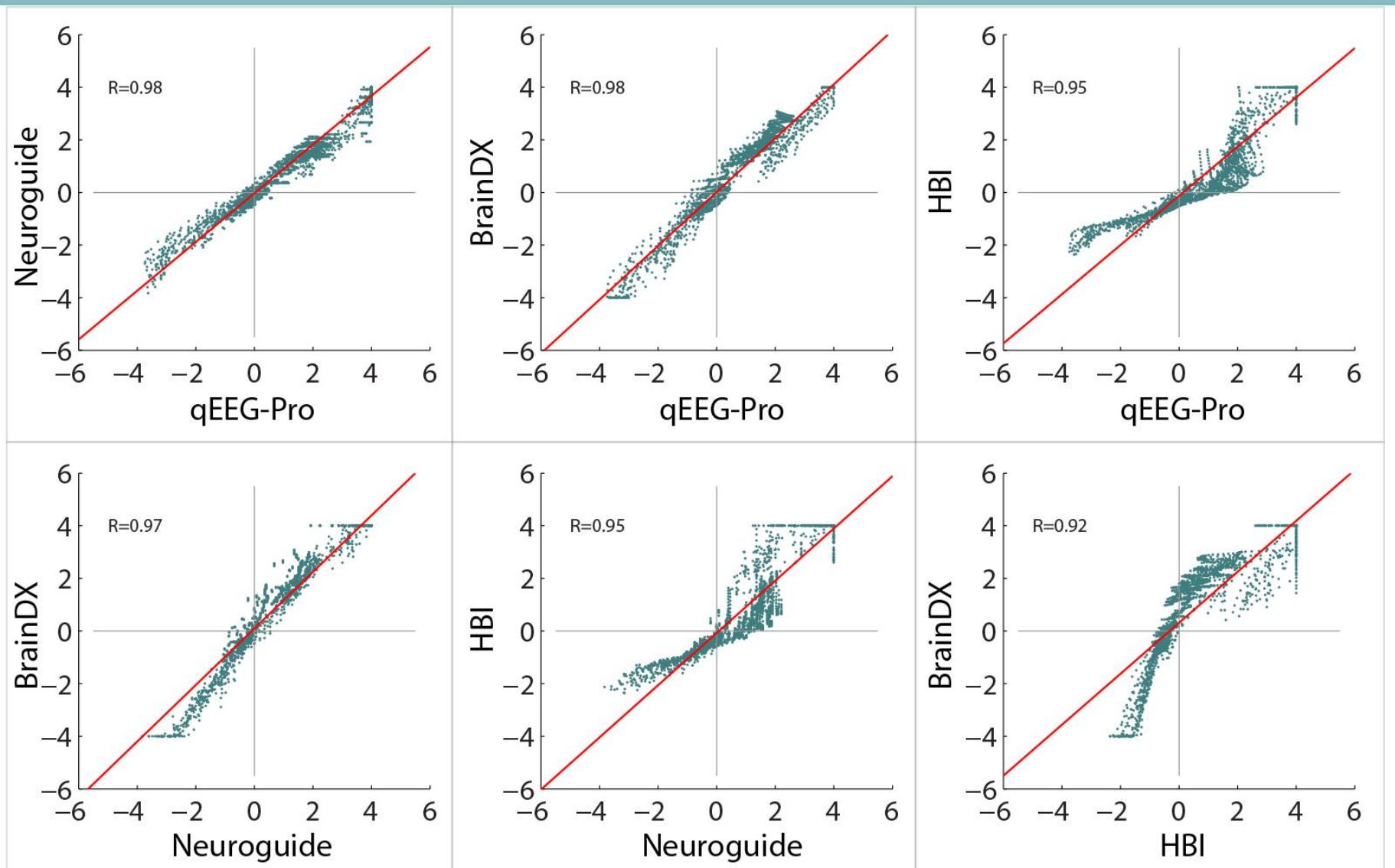


Subject 964666
Eyes Closed
Gender: Female
Age: 9.37

Z-score analyses – Theta (4-8Hz) –

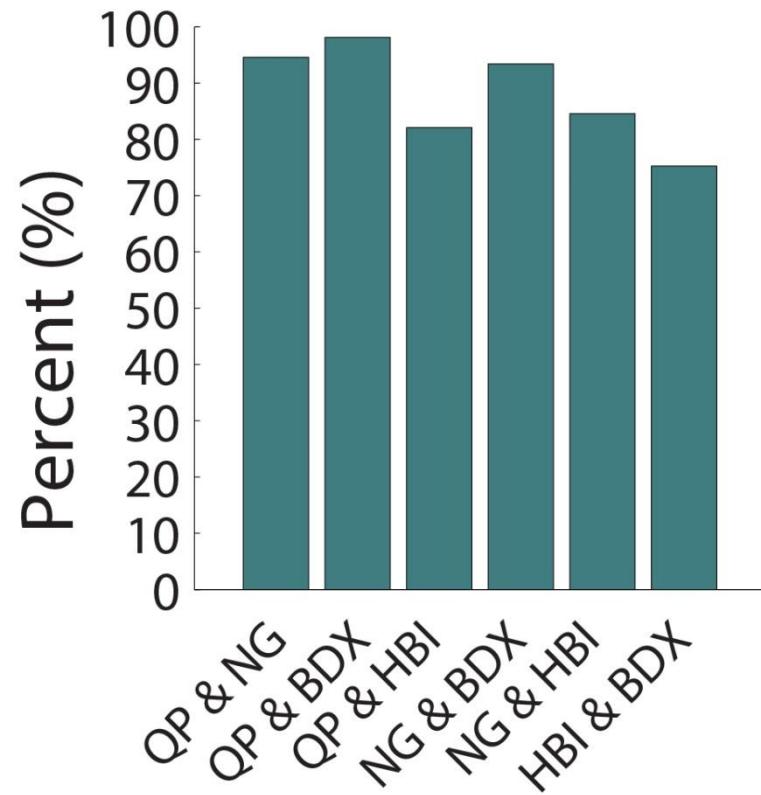


Theta (4-8Hz) – z-score clipped at -4 and 4



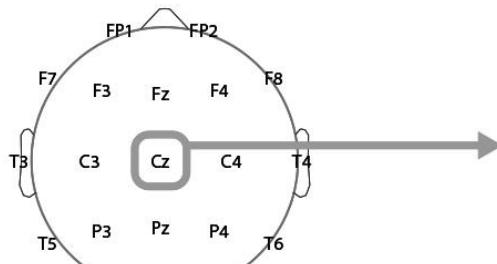
Z-score analyses – Theta (4-8Hz) –

Correspondence Theta



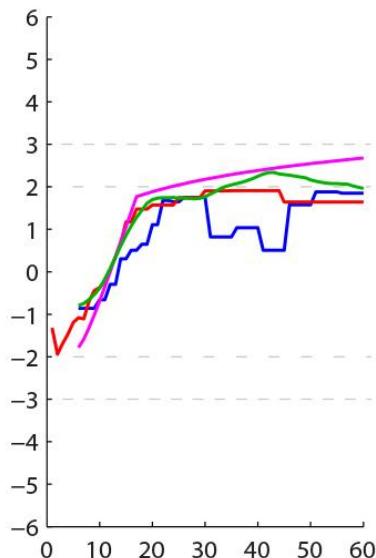
Z-score analyses – Theta (4-8Hz) –

— qEEG-Pro
— Neuroguide
— HBI
— BrainDX

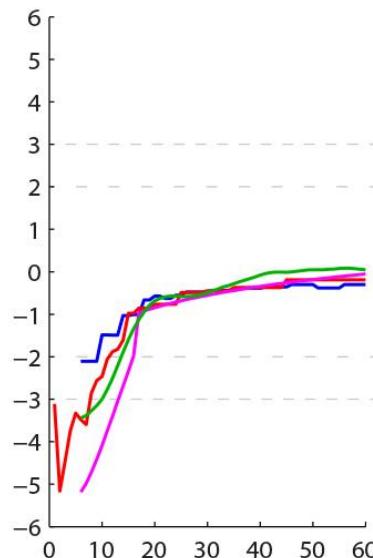


Z-score

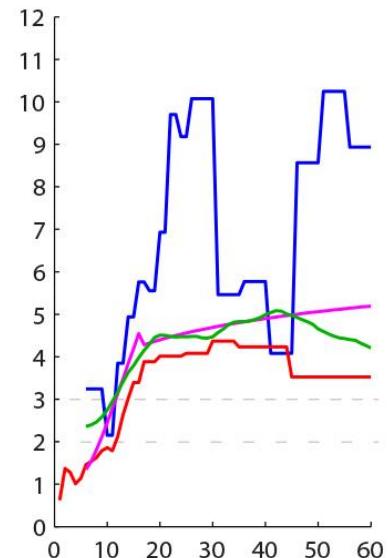
Age (years)

Subject 337822
Eyes Closed
Gender: Male
Age: 46.34

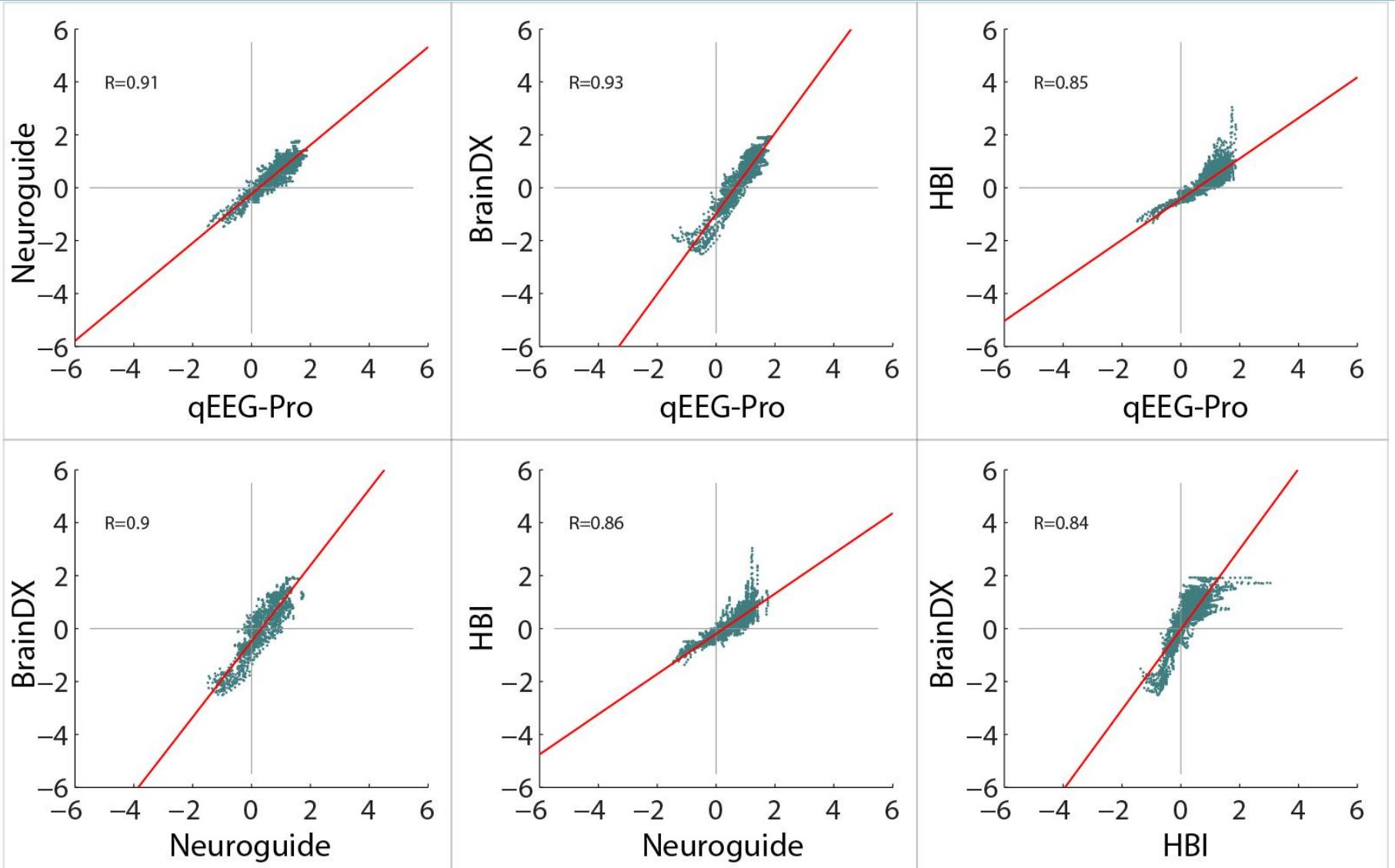


Subject 567795
Eyes Open
Gender: Female
Age: 47.92



Subject 964666
Eyes Closed
Gender: Female
Age: 9.37

Z-score analyses – Alpha (8-13Hz) –



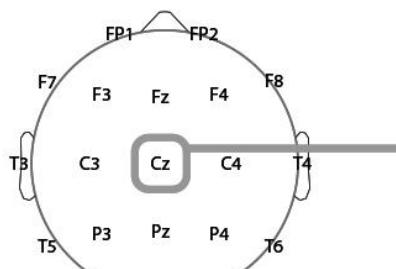
Z-score analyses – Alpha (8-13Hz) –

Correspondence Alpha

Unknown: Too few z-scores
over +2 or under -2.

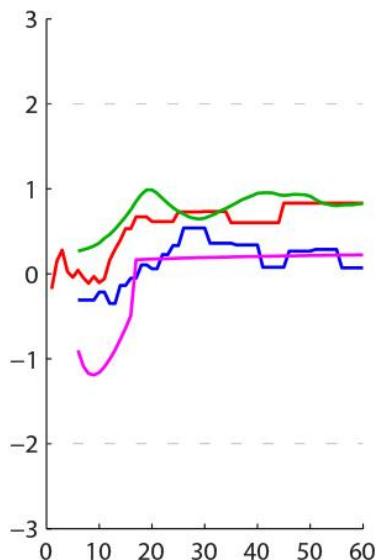
Z-score analyses – Alpha (8-13Hz) –

— qEEG-Pro
— Neuroguide
— HBI
— BrainDX

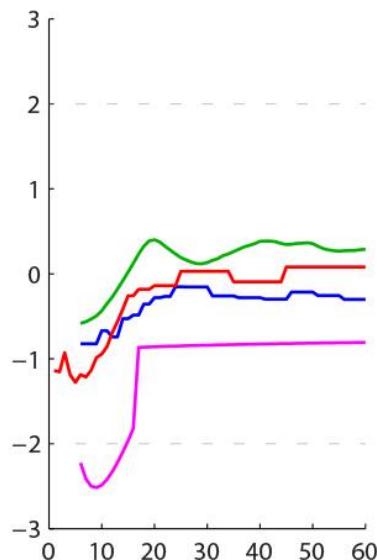


Z-score

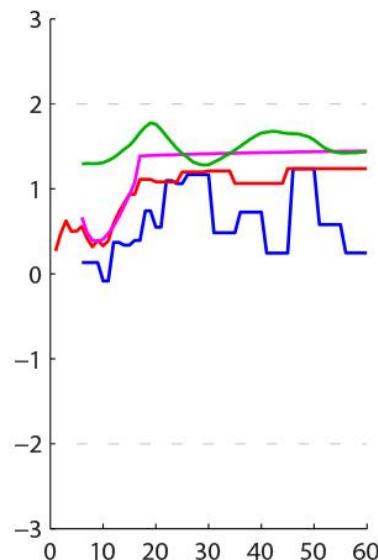
Age (years)



Subject 337822
Eyes Closed
Gender: Male
Age: 46.34

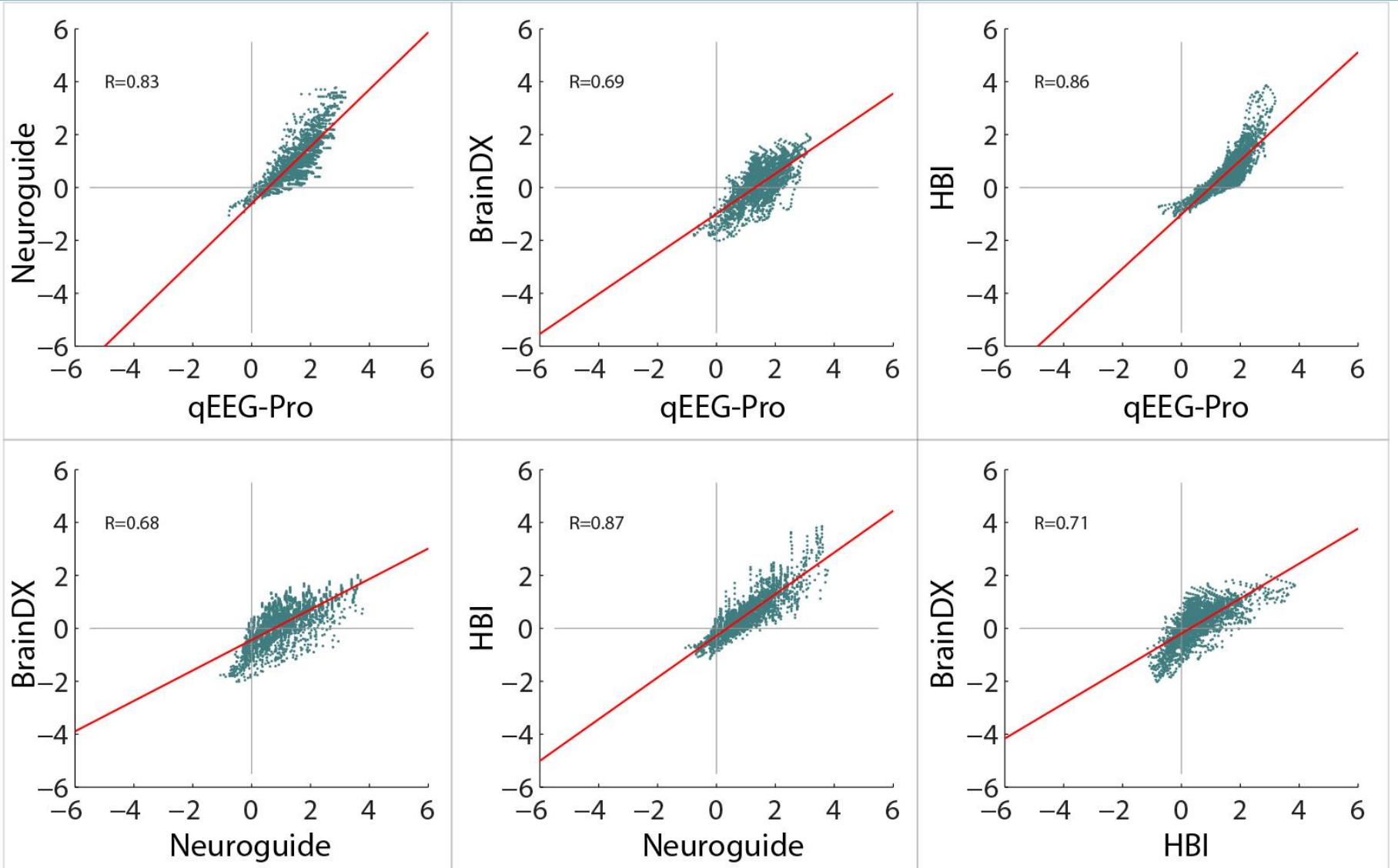


Subject 567795
Eyes Open
Gender: Female
Age: 47.92



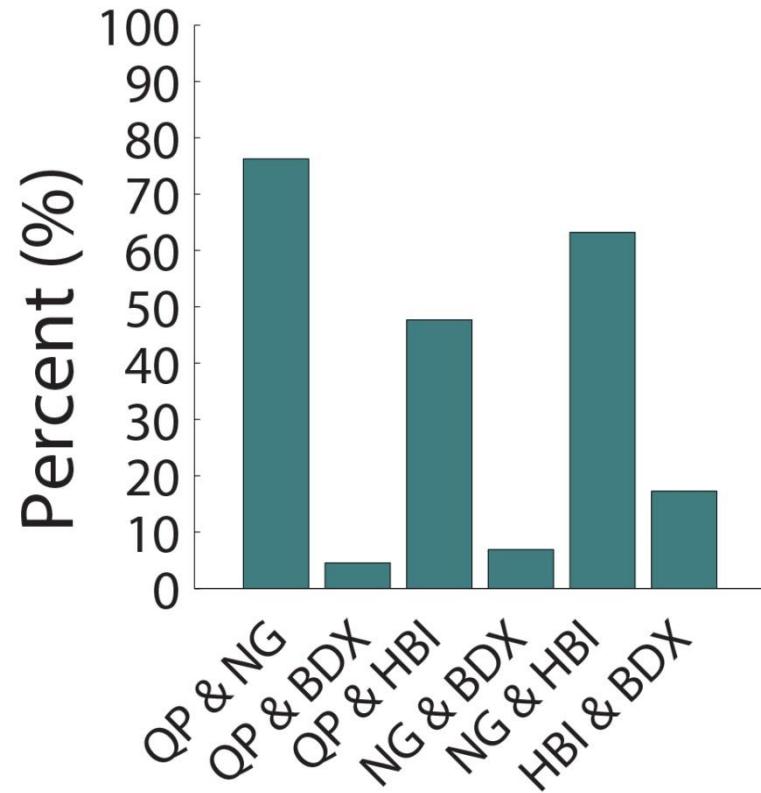
Subject 964666
Eyes Closed
Gender: Female
Age: 9.37

Z-score analyses – Beta (13-25Hz) –



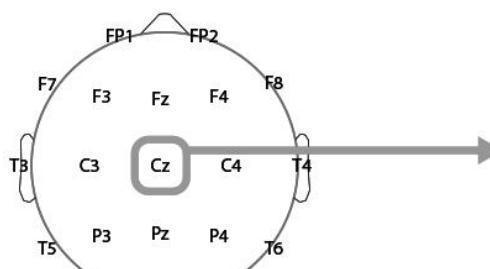
Z-score analyses – Beta (13-25Hz) –

Correspondence Beta

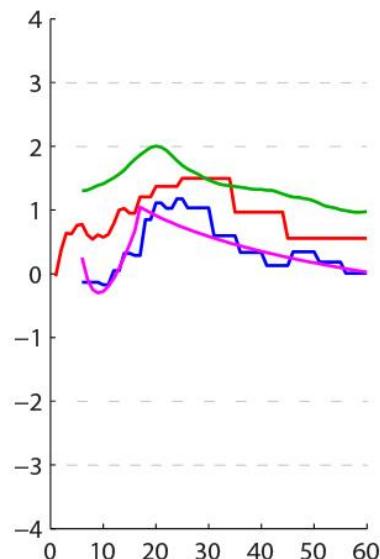
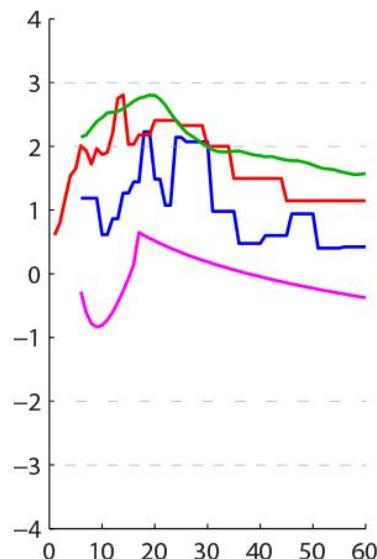
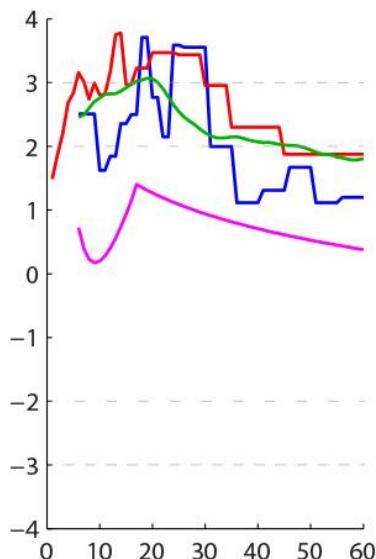


Z-score analyses – Beta (13-25Hz) –

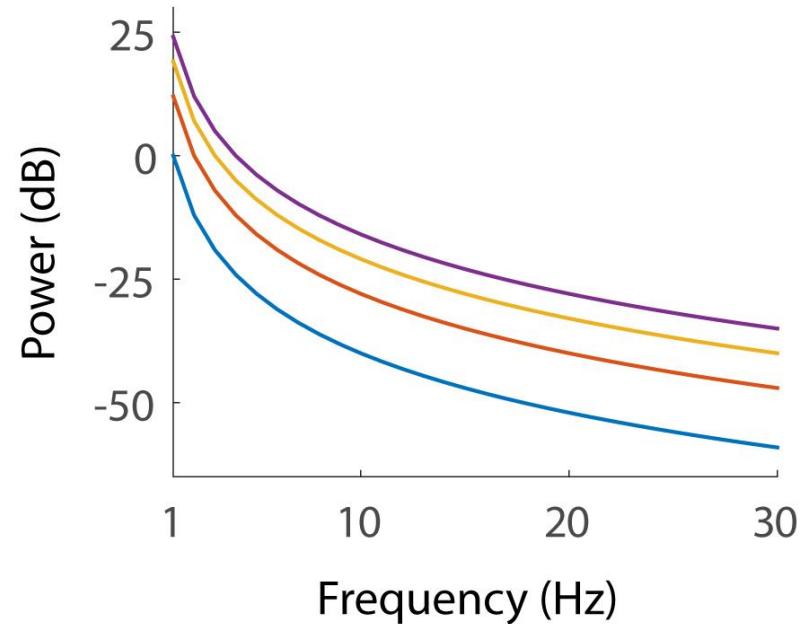
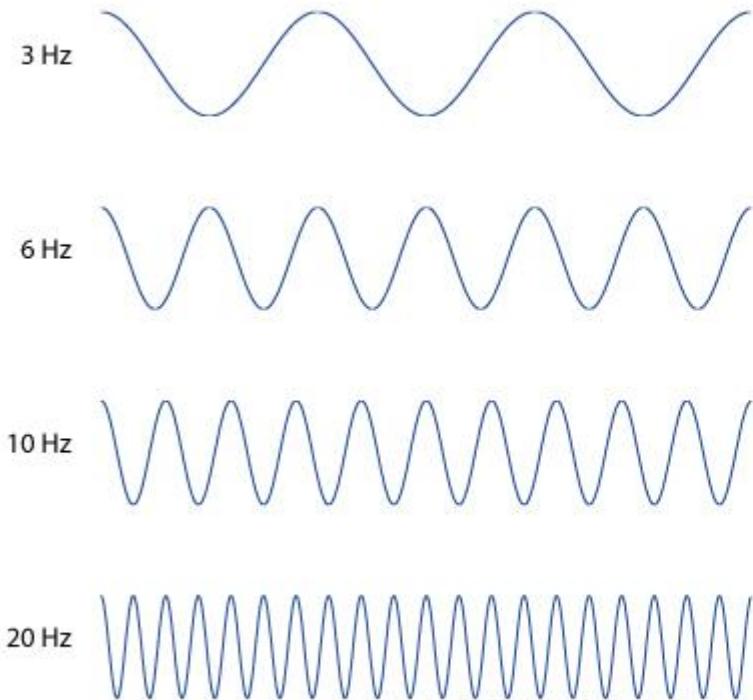
- qEEG-Pro
- Neuroguide
- HBI
- BrainDX



Z-score
Age (years)

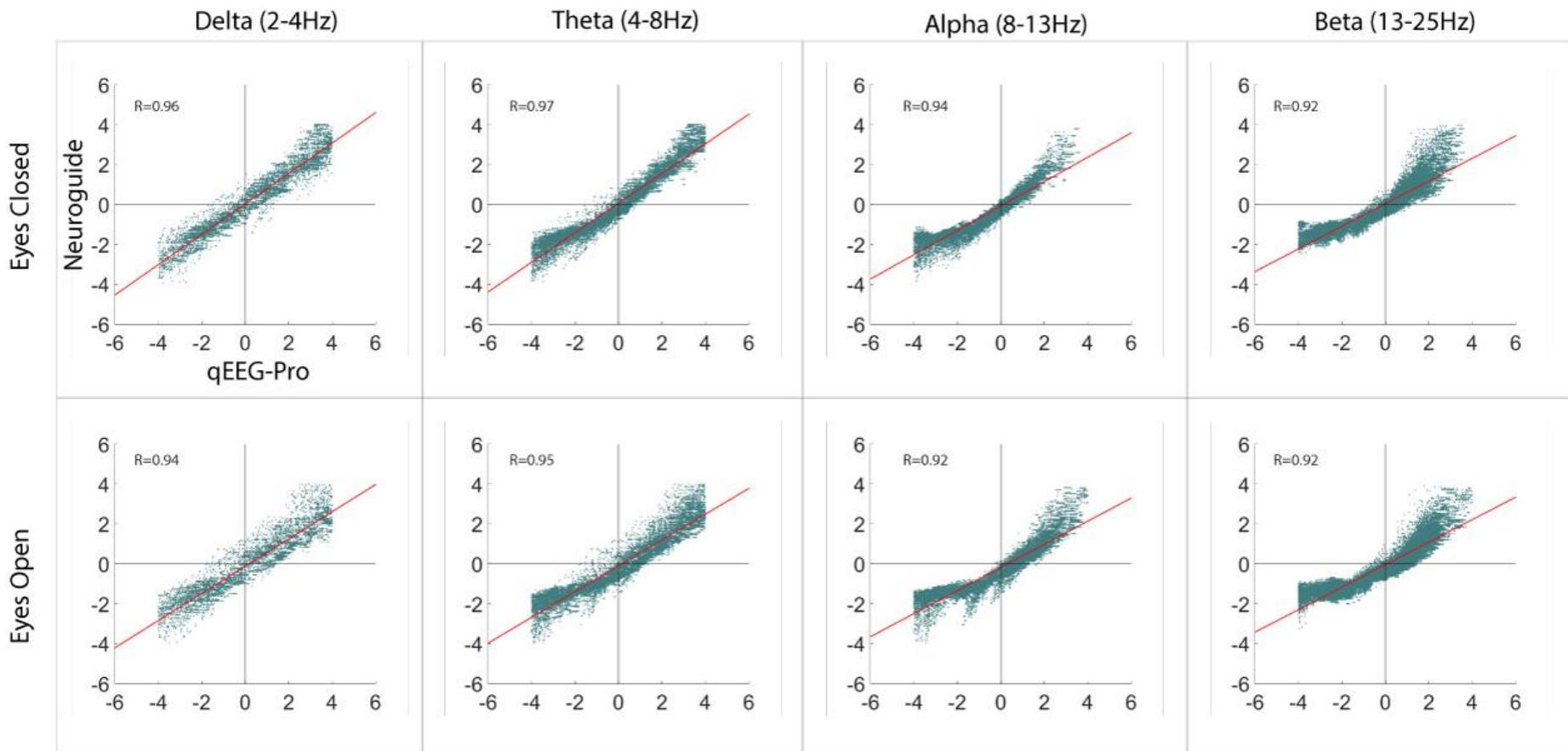


Artificial Signals

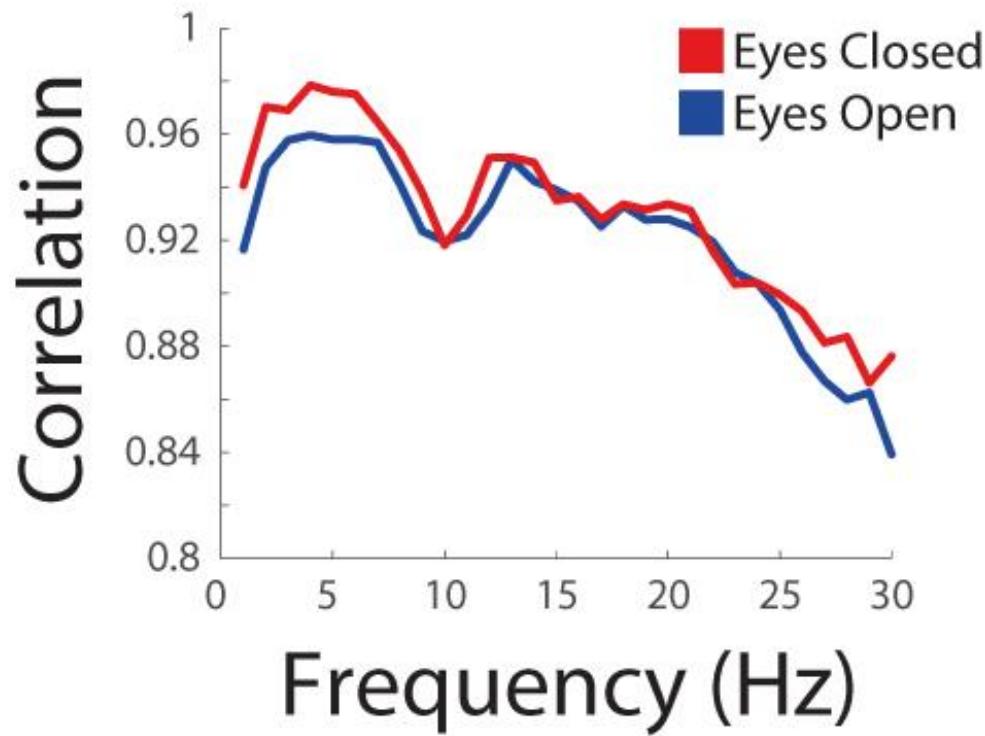


Artificial Signals

qEEG-Pro & Neuroguide z-score correlations Artificial Signals



Correlations per Discrete Frequency



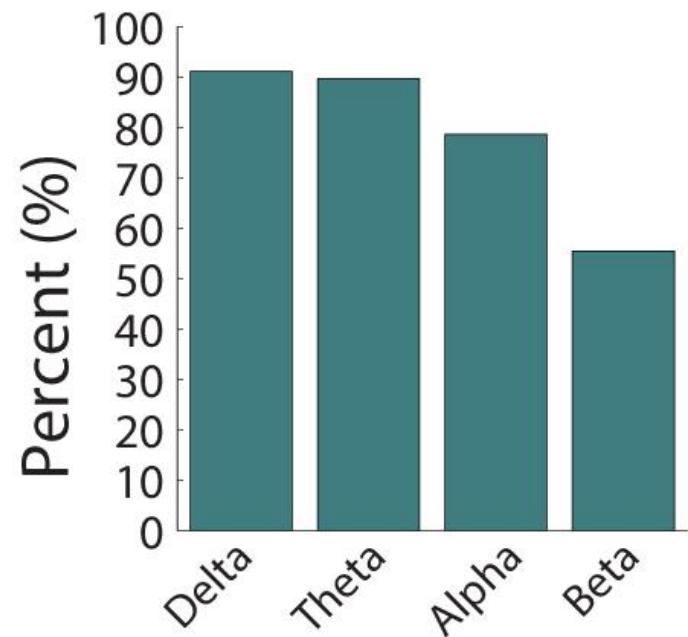
Artificial Signals

'Database correspondence':

If the z-score in one database is greater than 2,
is the z-score in the other database greater
than 1.5?

Same for z-scores smaller than -2?

Correspondence qEEG-Pro Neuroguide

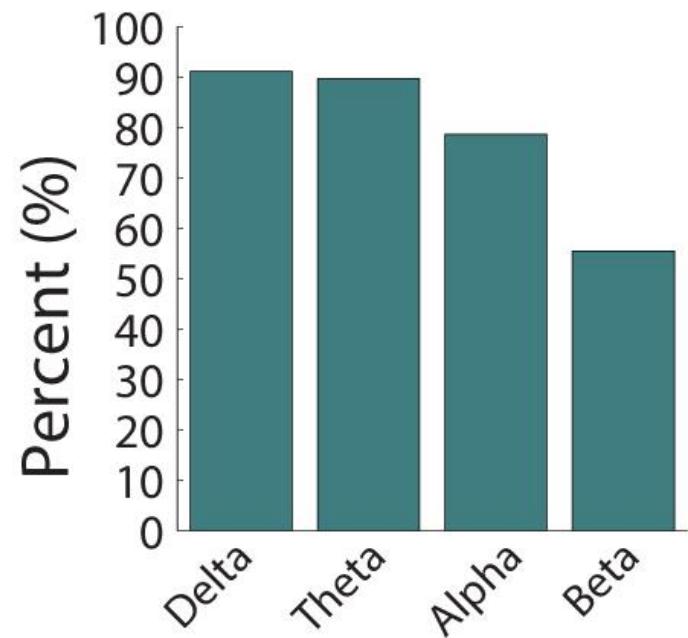
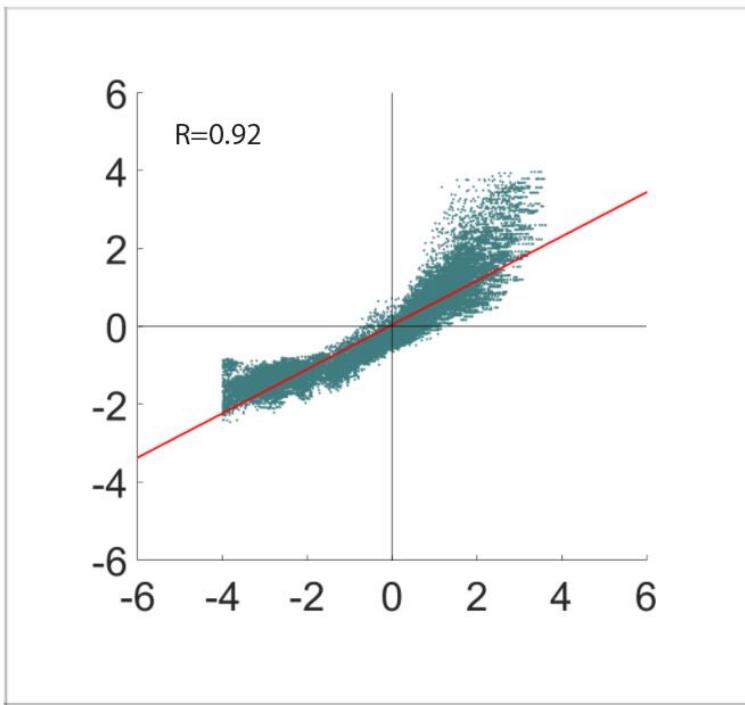


Artificial Signals

In Neuroguide, z-scores the Beta band don't go lower than -2

Correspondence qEEG-Pro Neuroguide

Beta (13-25Hz)



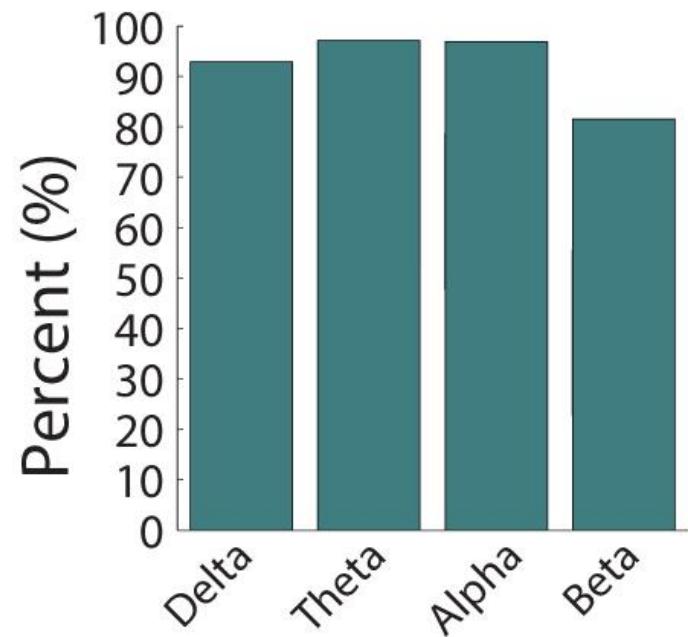
Artificial Signals

'Database correspondence':

If the z-score in one database is greater than **1.75**, is the z-score in the other database greater than **1.25**?

Same for z-scores smaller than **-1.75**?

Correspondence qEEG-Pro Neuroguide



Discussion

For Delta, Theta and Alpha the four databases are very similar.

HBI has very extreme z-scores compared to the other databases, but this has limited clinical relevance. The correlation increases when this is corrected for.

For Beta, differences arise.

Neuroguide and HBI seem to have discontinuities as a result of age bins, primarily in adult age ranges.

BrainDX seems to underestimate beta z-scores.

Thank you for your attention!