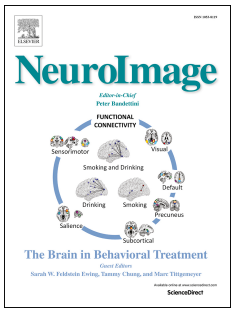
Accepted Manuscript



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Fiorenzo Artoni, Arnaud Delorme, Scott Makeig

PII: S1053-8119(18)30214-3

DOI: 10.1016/j.neuroimage.2018.03.016

Reference: YNIMG 14785

To appear in: *NeuroImage*

Received Date: 19 September 2017

Revised Date: 8 February 2018

Accepted Date: 7 March 2018

Please cite this article as: Artoni, F., Delorme, A., Makeig, S., Applying dimension reduction to EEG data by principal component analysis reduces the quality of its subsequent independent component decomposition, *NeuroImage* (2018), doi: 10.1016/j.neuroimage.2018.03.016.

Applying dimension reduction to EEG data by Principal Component Analysis reduces the quality of its subsequent Independent Component decomposition

Fiorenzo Artoni[1,2,*], Arnaud Delorme[3,4,#], Scott Makeig[3,#]

Affiliations

[1]The Biorobotics Institute, Scuola Superiore Sant'Anna, Pisa, Italy

[2]Translational Neural Engineering Laboratory, Center for Neuroprosthetics and Institute of Bioengineering, EPFL – Campus Biotech, Geneve, Switzerland

[3]Swartz Center for Computational Neuroscience, Institute for Neural Computation, University of California San Diego, La Jolla CA 92093-0559

[4]Univ. Grenoble Alpes, CNRS, LNPC UMR 5105, Grenoble, France.

[*] Correspondence to: fiorenzo.artoni@epfl.ch

[#] Equal Contributors

Summary Sentences

- It is currently a common practice to apply dimension reduction to EEG data using PCA before performing ICA decomposition.
- We tested the numbers and quality of meaningful Independent Components (ICs) separated from 72-channel data after different levels of rank reduction to a principal subspace.
- PCA rank reduction (even if removing only 1% of data variance) adversely affected the dipolarity and stability of ICs accounting for potentials arising from brain and known non-brain processes.
- PCA rank reduction also increased uncertainty in the equivalent dipole positions and spectra of the IC brain effective sources across subjects.
- For EEG data at least, PCA rank reduction should therefore be avoided or at least carefully tested on each dataset before applying dimension reduction as a preprocessing step.