Supplementary Information for

Standard multiscale entropy reflects neural dynamics at mismatched temporal scales

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S1 Text. Systematic literature search assessing the prevalence of global similarity bounds.

We performed a systematic literature search to assess the prevalence of global similarity bounds in current neuroscientific applications (heart rate variability applications are specifically marked). We searched Pubmed (https://www.ncbi.nlm.nih.gov/pubmed) with the following terms: *(MSE AND sample entropy AND EEG) OR (MSE AND brain AND variability) OR (MSE AND EEG AND variability) OR (multiscale entropy AND EEG AND variability).* We excluded any studies that did not assess multiscale entropy, including studies that were restricted to sample entropy at scale 1. In addition, we added references from the main text that were not captured by the systematic search (highlighted in grey). For MSE applications, we checked the text for a notion of how similarity bounds were computed, i.e., whether it was calculated as r*SD of the original time series or the coarse-grained time series. The following sections list the results of this qualitative review and is purely intended to characterize the prevalence of global similarity bounds, not as a qualitative judgement on the claims made in any particular paper. Our literature search revealed the following papers. The relative amount of studies with presumably global similarity bounds was as follows (39+13)/(39+13+4) = 0,928; i.e., > 90%.

Scale-invariant similarity bounds (r x global SD)

We chose this category, when the article contained the specific information that r was calculated from the original signal (i.e., scale-invariant).

Azami, Fernandez, and Escudero (2017)
Azami, Rostaghi, Abasolo, and Escudero (2017)
Carpentier et al. (2019)
Escudero, Abasolo, Hornero, Espino, and Lopez (2006) [but they note the issue]
Grandy, Garrett, Schmiedek, and Werkle-Bergner (2016)
Hadoush, Alafeef, and Abdulhay (2019)
Kaur et al. (2019)
M. Liu, Song, Liang, Knopfel, and Zhou (2019)
H. Liu et al. (2017) [HRV]
Lu et al. (2015)
McIntosh, Kovacevic, and Itier (2008)
Mizuno et al. (2010)
Weng et al. (2015)

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Unclear, assumed scale-invariant similarity bounds (r x global SD)

We chose this category, when the article did not contain any information about how r was calculated, or no reference was made to scale-specific adaptations. For many papers, Costa, Goldberger, and Peng (2002, 2005) or Richman and Moorman (2000) were cited, which use scale-invariant implementations.

Raja Beharelle, Kovacevic, McIntosh, and Levine (2012)
Bertrand et al. (2016)
Catarino, Churches, Baron-Cohen, Andrade, and Ring (2011)
Chen et al. (2015)(HRV)

Chen et al. (2018) (HRV)
Li, Chen, Li, Wang, and Liu (2016)
Chiu et al. (2015) (HRV)
Courtiol et al. (2016)
Gao, Hu, Liu, and Cao (2015)
Harati, Crowell, Huang, Mayberg, and Nemati (2019)
Harati, Crowell, Mayberg, Jun, and Nemati (2016)
Hasegawa et al. (2018)
Heisz and McIntosh (2013)
Heisz, Shedden, and McIntosh (2012)
Hu and Liang (2012) [RM]
Hussain, Saeed, Awan, and Idris (2018)
Hussain, Aziz, et al. (2018)
Jaworska et al. (2018)
Kuntzelman, Jack Rhodes, Harrington, and Miskovic (2018)
Lin et al. (2019) [BOLD]
H. Liu et al. (2018)
H. Y. Liu et al. (2018)
Q. Liu, Chen, Fan, Abbod, and Shieh (2015)
Q. Liu, Chen, Fan, Abbod, and Shieh (2017)
McIntosh et al. (2014)
Misic et al. (2015)
Misic, Vakorin, Paus, and McIntosh (2011)
Miskovic, Owens, Kuntzelman, and Gibb (2016)
Park, Kim, Kim, Cichocki, and Kim (2007)
Roldan, Molina-Pico, Cuesta-Frau, Martinez, and Crespo (2011)
Szostakiwskyj, Willatt, Cortese, and Protzner (2017)
Takahashi et al. (2009)
Takahashi et al. (2010)
Takahashi et al. (2016)
Ueno et al. (2015)
Yang et al. (2013)
H. Y. Wang, McIntosh, Kovacevic, Karachalios, and Protzner (2016)
H. Wang, Pexman, Turner, Cortese, and Protzner (2018)
Wei et al. (2014)

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Scale-wise similarity bounds (r x scale-wise SD)
We chose this category, when the article either specified that scale-wise recalculation of r parameters was performed, or when the description could allow that inference.

Fabris et al. (2014) [but with unclear variations in r]
Sleimen-Malkoun et al. (2015)
Valencia et al. (2009) [HRV]
Zavala-Yoe, Ramirez-Mendoza, and Cordero (2015)

#: 4

Not applicable
We chose this category, when multi-scale entropy was not used in the study (i.e., erroneous listing of paper).

El-Gohary, McNames, and Elsas (2008)
Erdogan, Yucel, and Akin (2014)
Fernandez, Gomez, Hornero, and Lopez-Ibor (2013)
Heunis, Aldrich, and de Vries (2016)
Hier, Jao, and Brint (1994)
Kielar et al. (2016) [BOLD MSE, single scale]
Nazari et al. (2019)
Puce, Berkovic, Cadusch, and Bladin (1994)
Sinai, Phillips, Chertkow, and Kabani (2010)
Verhaeghe, Gravel, and Reader (2010)
Xu, Cui, Hong, and Liang (2015)

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