The Brainstem Toolbox 2013

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If you publish or present results derived in part from using this toolbox, we ask that you cite it as follows:

> Skoe E, Nicol T & Kraus N (2013). The Brainstem Toolbox. Version 2013 (www.brainvolts.northwestern.edu)

If the journal does not allow you to cite a web site, then try:

> Skoe E, Kraus N. (2010) Auditory brainstem response to complex sounds: a tutorial. *Ear and Hearing* 31(3): 302-324.

Introduction

The Brainstem Toolbox (bt) includes three graphical user-interface (GUI) modules for performing a number of analyses on evoked responses.

(1) bt_gui	the "main module" for performing time & frequency domain analyses
(2) bt_gui_biomark_multi	(*New in version 2010)* designed specifically for users of the BioMARK software It is a paired down version of bt_gui. Multiple files can be processed iteratively.
(3) bt_ptgui	the "pitch tracking" (pt) module for assessing how well the frequency-following response follows the periodicity of the evoking stimulus.

This toolbox presents the results of these analyses in a single report for each file. This was designed with speech-evoked brainstem response in mind, so it emphasizes analyses appropriate to periodic signals, but is generalizable to responses evoked by any stimulus.

Requirements

Matlab is required. The Toolbox was developed in version 7.3 (2006b) on a PC. It has been tested on other 7.X versions. Other versions and platforms have not been verified.

What is it?
The Brainstem Toolbox is a collection of MATLAB functions (m-files). Most can be invoked from the command line, but to take fullest advantage of the Toolbox, the GUI should be used. (See help for command-line usage of individual functions.) The m-files that compose the "guts" of the program, reside in the programFiles folder.

Acknowledgments
The Toolbox consists of many of our own functions (all those prefixed with "bt_" and a few others), but also contains several functions and utilities borrowed from other sources. Please see individual m-files for author and copyright information.

New to MATLAB
The Mathworks site contains a comprehensive list of MATLAB tutorials.
http://www.mathworks.com/academia/student_center/tutorials/launchpad.html

Errors and bugs
We would like to be informed about any bugs you might encounter. Please email Travis White-Schwoch, tws@u.northwestern.edu.

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Suggested Reading
(available for download: http://www.soc.northwestern.edu/brainvolts/publications.php)

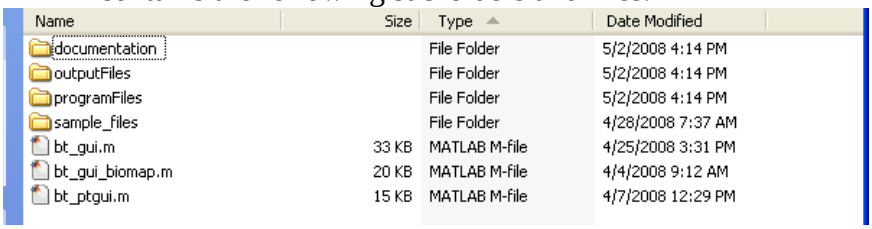
Skoe E, Kraus N. (2010) Auditory brainstem response to complex sounds: a tutorial. *Ear and Hearing* 31(3): 302-324.

Pitch Tracking
Song JH, Skoe E, Wong PCM, Kraus N. (2008) Plasticity in the adult human auditory brainstem following short-term linguistic training. *J Cogn Neurosci.*

Wong PCM, Skoe E, Russo NM, Dees T, Kraus N. (2007) Musical experience shapes human brainstem encoding of linguistic pitch patterns. *Nature Neurosci* 10:420-422.

How to use it

1. Installation. "Unzip" the distribution file into a new folder.
2. Launch Matlab an/d browse to the folder containing the Toolbox functions. The folder contains the following subfolders and files.



Description of subfolders:

Documentation	Tutorials and suggested readings
outputFiles	All files generated by bt get saved here.
programFiles	The "inner guts" of the bt program (m-files and fig files).
sample_files	Sample avg, txt, mrk, xls files

3. At the command prompt, type the name of the module you want to run
   Example: >> bt_gui
4. For specifics on how to use each module, refer to the respective user tutorials in the documentation folder.