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1996 Annual Meeting
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Themes and Topics

See list of themes and topics, pp. 17-18. Indicate below a first and second choice appropriate for programming and publishing your paper.

1st theme title: Neural Basis of Behavior theme letter: I
1st topic title: Cognition topic number: 112

2nd theme title: Neural Basis of Behavior theme letter: I
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Abstract 2 of a. should come after abstract of Buckner, Dale et al.
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Key Words: (see instructions p. 4)

1. fMRI 3. speech
2. prefrontal 4. _____

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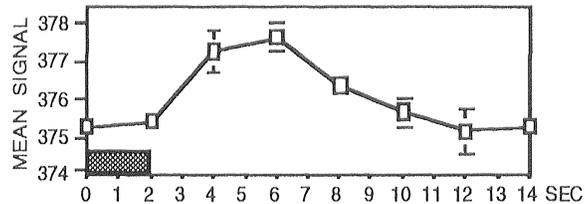
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fMRI IMPULSE RESPONSE CHARACTERISTICS FOR PREFRONTAL ACTIVATION DURING WORD-STEM COMPLETION P.A. Bandettini*, R.L. Buckner, K.M. O'Craven, R.L. Savoy and B.R. Rosen. MGH-NMR Center, Boston, MA 02129

Data presented in the companion abstract demonstrate within-subject reliability of prefrontal activation for a word-stem completion task. In the present study, we demonstrate that significant fMRI signal changes can be elicited in prefrontal areas using single trials for the same task. Use of single trial responses may be optimal for tasks that would benefit from mixed, rather than blocked, design.

Using a region defined on data from a block-designed word-stem completion task (see companion abstract for methods), fMRI time series data from 4 subjects were analyzed for separate runs containing spaced single word-stem completion trials (15 trials per run, 1 trial every 14 sec, 4 runs per subject). Shown below are signal averages for the left inferior prefrontal region for the first subject. (Shaded area represents approximate word-stem on time. Data are shown with standard error bars.) This ~1% signal change was reproducible across subjects.



These studies demonstrate that single trials can be used to map cognitive function. This cognitive "impulse response" approach may be optimal for cognitive tasks requiring stimulus or task randomization, or in cases where individual trials differ based on performance measures obtained from the subject.
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