

# Author's Accepted Manuscript

## Voxel-based Lesion Analysis of Brain Regions Underlying Reading and Writing

Juliana V. Baldo, Natalie Kacinik, Carl Ludy, Selvi Paulraj, Amber Moncrief, Vitória Piai, Brian Curran, And Turken, Tim Herron, Nina F. Dronkers



PII: S0028-3932(18)30114-3  
DOI: <https://doi.org/10.1016/j.neuropsychologia.2018.03.021>  
Reference: NSY6724

To appear in: *Neuropsychologia*

Received date: 15 June 2017  
Revised date: 23 February 2018  
Accepted date: 17 March 2018

Cite this article as: Juliana V. Baldo, Natalie Kacinik, Carl Ludy, Selvi Paulraj, Amber Moncrief, Vitória Piai, Brian Curran, And Turken, Tim Herron and Nina F. Dronkers, Voxel-based Lesion Analysis of Brain Regions Underlying Reading and Writing, *Neuropsychologia*, <https://doi.org/10.1016/j.neuropsychologia.2018.03.021>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Voxel-based Lesion Analysis of Brain Regions Underlying Reading and Writing

Juliana V. Baldo<sup>1\*</sup>, Natalie Kacinik<sup>2</sup>, Carl Ludy<sup>1</sup>, Selvi Paulraj<sup>1,3</sup>, Amber Moncrief<sup>1</sup>, Vitória Piai<sup>4,5</sup>, Brian Curran<sup>1</sup>, And Turken<sup>1</sup>, Tim Herron<sup>1</sup>, Nina F. Dronkers<sup>1,6</sup>

<sup>1</sup>VA Northern California Health Care System

<sup>2</sup>Brooklyn College, City University of New York,

<sup>3</sup>Palo Alto University

<sup>4</sup>Radboud University, Donders Centre for Brain, Cognition and Behaviour

<sup>5</sup>Radboudumc, Department of Medical Psychology

<sup>6</sup>University of California, Davis

\*Correspondence to: 150 Muir Rd. (126R), Martinez, CA 94553, Tel.: (925) 372-4649; fax: (925) 372-2553. juliana@ebire.org

Abstract

The neural basis of reading and writing has been a source of inquiry as well as controversy in the neuroscience literature. Reading has been associated with both left posterior ventral temporal zones (termed the “visual word form area”) as well as more dorsal zones, primarily in left parietal cortex. Writing has also been associated with left parietal cortex, as well as left sensorimotor cortex and prefrontal regions. Typically, the neural basis of reading and writing are examined in separate studies and/or rely on single case studies exhibiting specific deficits. Functional neuroimaging studies of reading and writing typically identify a large number of activated regions but do not necessarily identify the core, critical hubs. Last, due to constraints on the functional imaging environment, many previous studies have been limited to measuring the brain activity associated with single-word reading and writing, rather than sentence-level processing. In the current study, the brain correlates of reading and writing at both the single- and sentence-level were studied in a large sample of 111 individuals with a history of chronic stroke using voxel-based lesion symptom mapping (VLSM). VLSM provides a whole-brain, voxel-by-voxel statistical analysis of the role of distinct regions in a particular behavior by comparing performance of individuals with and without a lesion at every voxel. Rather than comparing individual cases or small groups with particular behavioral dissociations in reading and writing, VLSM allowed us to analyze data from a large, well-characterized sample of stroke patients exhibiting a wide range of reading and writing impairments. The VLSM analyses revealed that reading was associated with a critical left inferior temporo-occipital focus, while writing was primarily associated with the left supramarginal gyrus. Separate VLSM analyses of single-word versus sentence-level reading showed that sentence-level reading was uniquely associated with anterior to mid-portions of the middle and superior

Download English Version:

<https://daneshyari.com/en/article/7317348>

Download Persian Version:

<https://daneshyari.com/article/7317348>

[Daneshyari.com](https://daneshyari.com)