

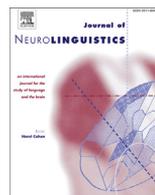


ELSEVIER

Contents lists available at SciVerse ScienceDirect

Journal of Neurolinguistics

journal homepage: www.elsevier.com/locate/jneuroling



The role of subcortical structures in recited speech: Studies in Parkinson's disease



Kelly A. Bridges^{a,b,*}, Diana Van Lancker Sidtis^{a,b},
John J. Sidtis^{b,c}

^a Department of Communicative Sciences and Disorders, New York University, 665 Broadway, New York, NY 10012, USA

^b Geriatrics Division, The Nathan Kline Institute for Psychiatric Research, 140 Old Orangeburg Rd., Orangeburg, NY 10962, USA

^c Psychiatry Department, New York University Langone Medical Center, 550 First Ave., New York, NY 10016, USA

ARTICLE INFO

Article history:

Received 29 October 2012

Accepted 29 April 2013

Keywords:

Parkinson's disease

Dual-process model

Recited speech

Formulaic language

ABSTRACTS

The role of subcortical structures in language function is complex and dependent on language task, with studies increasingly showing subcortical involvement for the production of formulaic language, including recited speech. Individuals with Parkinson's disease (PD), with ($n = 6$) and without ($n = 7$) surgical treatment, deep brain stimulation (DBS), were compared to healthy adults ($n = 14$) to determine whether individuals with subcortical dysfunction produce more errors during a recitation speech task. Participants were asked to recite poems, prayers, and rhymes familiar to them in order to determine the effects of subcortical disease on recited speech ability. When compared with healthy controls, the DBS-OFF group produced significantly more error words, suggesting that deficits in recitation arise with severe states of subcortical dysfunction. Individuals with DBS in the ON or OFF conditions did not differ significantly during the recited speech task. Results support a model of language where large units of overlearned language are at least partially modulated by subcortical structures.

© 2013 Elsevier Ltd. All rights reserved.

* Corresponding author. New York University, Department of Communicative Sciences and Disorders, 665 Broadway, Suite 9, New York, NY 10012, USA. Tel.: +1 212 998 5230; fax: +1 212 995 4356.

E-mail addresses: kab516@nyu.edu (K.A. Bridges), diana.sidtis@nyu.edu (D. Van Lancker Sidtis), john.sidtis@nyu.edu (J.J. Sidtis).

1. Background

Neural organization and allocation of speech and language function have long been attributed to cortical structures in the left cerebral hemisphere; however, current research provides additional support for subcortical and right-hemisphere involvement in specific aspects of verbal communication, including those reflecting pragmatic competence. John Hughlings Jackson (1874/1958) described two forms of speech, propositional and non-propositional, that are differentially affected by aphasia. The study of non-propositional or automatic speech was seemingly overshadowed throughout much of the 20th century by the generative grammar movement (Chomsky, 1957, 1965) and emphasis was placed on novel, newly created utterances (Van Lancker, 1975). However, cases were described by aphasiologists through the mid-to-late 20th century that showed selective preserved production of automatic speech (e.g., *yes/no*, counting, reciting the days of the week), fixed or formulaic expressions (e.g., *yes, hello, well* and *you know*, pause fillers including *uh* and *um*), and even longer units of overlearned language (e.g., songs, poems, rhymes, quotations) following damage to the left cortical regions from stroke or hemispherectomy (see Riese, 1949; as cited in Critchley, 1967; Critchley, 1970; Espir & Rose, 1970; Smith, 1966; Smith & Burklund, 1967; Zangwill, 1967). The selective preservation of these overlearned structures, formulaic as well as recited language, following damage to the left-cerebral hemisphere suggests the role of the right-hemisphere and, likely, subcortical regions in the production of at least some forms of language (Code, 1982; Espir & Rose, 1970; Van Lancker Sidtis, 2004, 2006, 2012; Wray & Perkins, 2000; Zangwill, 1967). This evidence of preserved overlearned language units following left-hemisphere damage suggests a dual-process model of language production, whereby formulaic language production is modulated by a subcortical-right hemisphere circuit and novel language is modulated by the left-hemisphere (Sidtis, Canterucci, & Katsnelson, 2009; Van Lancker Sidtis, 2004; Wray & Perkins, 2000). Based in current theories, this work is motivated by a desire to discover whether longer units of overlearned linguistic material, namely recited speech, also fall under the purview of subcortical structures, thereby providing further evidence for the dual process model of language production.

The involvement of subcortical structures in language production can be examined through the study of individuals with selective neural damage to or preservation of functional areas of the brain (e.g., cortical and subcortical stroke, Alzheimer's disease, Parkinson's disease). Recitation speech is thought to be modulated by subcortical structures, such as the basal ganglia, and can be examined by studying patients with Parkinson's disease, who have subcortical dysfunction. By examining performance in individuals with Parkinson's disease, more can be learned about the nature of the neural control of this type of routinized language task.

1.1. Idiopathic Parkinson's disease

Idiopathic Parkinson's disease (PD) is a progressive neurodegenerative disease caused by deterioration of the substantia nigra in the midbrain. This deterioration causes upstream imbalances in the functioning of subcortical and cortical areas, with specifically devastating effects in the complex pathways of the basal ganglia (Bhatnagar, 2008; Graybiel, 1996). Impairments due to dopaminergic imbalances in the basal ganglia result in heterogeneous patient profiles of symptoms associated with PD, but some symptoms are commonly observed. These symptoms can include bradykinesia (slowed movements), akinesia (reduced initiation of movements), disturbances in gait, cogwheel rigidity, resting tremor, and hypokinetic dysarthria (Duffy, 2012).

1.2. Involvement of subcortical structures in formulaic language

A common language symptom observed with various types of subcortical dysfunction is a sparseness of formulaic language (see below). Current thought indicates that formulaic language falls under the pragmatic domain of language, as it consists of commonly used phrases that aid in pragmatic aspects of communication, and it has been proposed to be modulated in part by a subcortical-right-hemisphere circuit (Sidtis et al., 2009; Van Lancker, 1987; Van Lancker Sidtis, 2004, 2006, 2012).

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات