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An Open-Label Trial of Bromocriptine in Nonfluent Aphasia: A Qualitative Analysis of Word Storage and Retrieval

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Anomia is a commonly found in aphasia and has been attributed to a loss of representations (storage deficit) or to a loss of access to these representations (retrieval deficit). Bromocriptine, a dopamine agonist, was tested on four patients, two men and two women, with nonfluent aphasia. The patients were tested in an open-label ABBA design using a stochastic model that measured the degree of storage and retrieval deficits. All patients showed significant improvements in word retrieval. Bromocriptine may be a useful adjunct in the treatment of selected patients with a nonfluent aphasia in which retrieval deficits play a major role. © 2000 Academic Press

Key Words: aphasia; anomia; treatment; bromocriptine; dopamine; storage; retrieval.

INTRODUCTION

Individuals with aphasia are likely to demonstrate persistent difficulties finding words (Benson, 1988; German, 1990). While all types of aphasia are known to demonstrate word-finding errors (Benson, 1988; German, 1990; Laine, Kujala, Niemi, & Uusipaikka, 1992), anterior lesions are generally associated with nonfluent speech and relatively spared auditory comprehension, while posterior lesions result in fluent speech and disrupted auditory comprehension (LaPointe, 1990; Goodglass, 1993). However, German (1990) notes that, by definition, individuals with a true word-finding disorder have difficulty naming target words in the presence of good comprehension of those words. Word-finding difficulties may also be indicated by increased latency and reduced accuracy on word-finding tasks (Snyder & Godley, 1992).

Several factors can affect word finding: Words representing concrete ob-

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jects are more easily retrieved than words representing abstract concepts (Snyder & Godley, 1992). The linguistic context in which word retrieval is required can vary in difficulty. For example, studies have shown that the format of sentence completion, such as a cloze procedure, provides an easier linguistic context for retrieval than does confrontation naming (Snyder & Godley, 1992). The nature of verbal responses can also range in difficulty from simple one-word responses to more syntactically complex sentence responses.

Shallice (1988) proposed that both word storage and retrieval functions are emergent properties of a single neuronal network (lexical/semantic network). This model predicts that damage to this neural network can result in either the degradation of previously stored information (a storage deficit) or disruption of the access routes to the stored information (a retrieval deficit). The extent to which storage or retrieval deficits contribute to a word-finding deficit remains undefined. Warrington and Shallice (as cited in Shallice, 1988) and Faglioni and Botti (1993) posit that it is possible to identify the degree to which deficits in either of the two components, storage or retrieval, contribute most to an individual's impaired naming ability. While the Warrington and Shallice method involves analyzing various observable patterns of the individual's naming errors, Faglioni and Botti (1993) approach the same issue from probability theory.

Faglioni and Botti's (1993) stochastic method, based on a Markovian process, makes several assumptions about the consistency of an individual's word choice on multiple trials of a naming task in order to separate a storage process from a retrieval process. The first assumption is that consistent incorrect naming across trials (e.g., a participant names an object incorrectly on both trial 1 and trial 2) most likely predicts a degraded storage mechanism. The second assumption is that an inconsistent naming pattern (e.g., a participant names an object incorrectly on trial 1 and correctly on trial 2 or vice versa) most probably predicts degraded access to the semantic store (Faglioni & Botti, 1993). The ability to segregate a storage from a retrieval deficit using an objective and statistically valid process presents a unique opportunity to assess the degree to which these components are affected in nonfluent aphasia and how they respond to pharmacological intervention.

Bromocriptine (BRC) has been used as a medication for the treatment of aphasia because of its physiological effect and its receptor distribution (Thorner, Fluckiger, & Calne, 1988). The mesolimbic and mesocortical dopamine system selectively inhibits transmission of sensory information, which enhances the signal-to-noise ratio (Walker-Batson & Purdy, 1991). This process, known as lateral inhibition, is important in information processing of all sensory systems. Typically, damage to the mesolimbic/mesocortical pathway is associated with deficits in frontal-lobe functions (Muller & Von Cramon, 1994). Dopamine also has a stimulating effect on motor activity and learning (Muller & Von Cramon, 1994). The reported

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