

gan et al., 1984) using different measures (naming latency, gaze duration), this position appears to be located at the word center rather than to the left of the center of the word. It would be difficult to explain this central position of OVP by either the hypothesis in terms of a hemispheric specialization (Brysbart & Ydewalle, 1990) or an asymmetric perceptual span (Rayner et al., 1980). Regarding the lexical hypothesis (O'Regan & Jacobs, 1992), the present state of research neither confirms nor rejects it. On the one hand, visual fixation on the third letter induces better letter identification for all kinds of stimuli; on the other hand, in terms of reading performance only words benefit from third letter fixation. Further experiments mixing stimuli of different length and nature are still needed to thoroughly investigate OVP in reading and to verify the proposal that only oculomotor factors could account for OVP (Nazir et al., 1992).

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Language Production and Comprehension in an Adult with ACoA Syndrome

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This study explored the prediction that cases with anterior communicating artery (ACoA) syndrome will exhibit deficits in higher-level language production and comprehension. A 65-year-old adult male with a history of ACoA syndrome was tested on higher-level linguistic tasks. The patient's performance on discourse comprehension, discourse production, and linguistic ambiguity comprehension tasks was impaired. © 2001 Academic Press

Introduction

The anterior communicating artery (ACoA) supplies septal nuclei, genu of the corpus callosum, anterior cingulum, optic chiasm, columns of the fornix, substantia inominato, anterior hypothalamus, and the mesial anterior commissure (DeLuca & Diamond, 1995). Some of these structures, especially the anterior cingulum, play a crucially important role in episodic and semantic memory as well as in attentional mechanism (Desgranges et al., 1998; Cabeza et al., 1997; Grossman et al., 1992). As a part of the ventromedial cortices, the anterior cingulate gyrus receives projections from all sensory modalities including vision, audition, and touch and maintains bidirectional connections with other memory related structures such as hippocampus and amygdala (Tranel & Damasio, 1995; Frackowiak et al., 1997).

Interruption of the ACoA has the potential to affect memory, given the fact that ACoA supplies many areas that serve memory. Persistent anterograde and/or retrograde memory deficits are frequently observed in this population. A profound deficit of recall from long-term memory often exists, whereas recognition and short-term memory seem less disturbed (Irle et al., 1992; Hanley et al., 1994). The ACoA syndrome, seen in patients who survived the bursting of aneurysm in the ACoA, consists of amnesia, confabulation, and personality change (Alexander et al., 1984). Most studies, including a comprehensive review of literature in this area (DeLuca & Diamond, 1995), have reported that language functions (expressive, receptive, naming, repetition, reading, writing, etc.) were preserved in ACoA syndrome. Only one case was reportedly aphasic (Steinman & Bigler, 1986).

Contrary to the assertion about the preservation of language functions in this population, there appears to be ground for impairment of higher-level language functions in ACoA syndrome. As the recent years have witnessed, the clinical populations that were traditionally known mostly for motor speech disorders and/or cognitive deficits (e.g., patients with right hemisphere damage, Parkinson's disease, or Huntington's disease), when came under closer scrutiny, revealed the existence of higher-level language problems. (Cohen et al., 1994; Grossman et al., 1992; Murray & Stout, 1999; Sherratt & Penn, 1990). Furthermore, a few studies have reported high correlation between cognitive impairments (e.g., attention or memory deficits) and sentence/discourse level comprehension in patients with degenerative diseases (Grossman et al., 1992; Murray & Stout, 1990). Discourse comprehension and narrative recall require, among other things, intact cognitive resources such as short-term memory (STM) and long-term (episodic and semantic) memory systems (Sherratt & Penn, 1990). Phonological short-term memory, a component of STM, adjudicates between conflicting interpretation of a given sentence and allows repeated attempts to understand complex sentences (Van der Linden & Poncelet, 1998). However, not all memory researchers agree with the separation of memory from language (MacKay & Abrams, 1996).

In ACoA syndrome, as several neuropsychological studies have reported, both long- and short-term memory systems may be implicated to varying degrees. A striking feature of the previous research related to ACoA syndrome is the lack of studies that looked at higher-level language performance. In light of the studies reviewed above, the present study explores the prediction that patients with ACoA syndrome will be impaired in comprehension of ambiguous sentences and narrative discourse as well as in narrative production/recall.

Methods

Subject. JG, a 64-year-old male who is a resident of a long-term rehabilitation hospital, was diagnosed with ACoA syndrome. On November 4, 1985, this case was admitted to an emergency hospital following a sudden collapse and unresponsiveness.

When he was brought to the emergency room, clinical examination revealed no focal neurological signs. A CT scan performed 3 days later was indicative of diminishing subarachnoid hemorrhage and a persistent focal subarachnoid hemorrhage in the region of the anterior communicating artery aneurysm. The CT scan also revealed lesions in the anterior inferior, medial frontal lobe, cingulate gyrus, posterior inferior frontal gyrus, and anterior callosal margins.

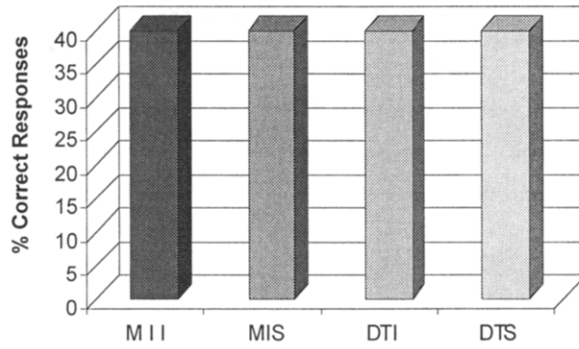
Neuropsychological evaluation. JG underwent extensive neuropsychological evaluation. The neuropsychological report indicates that JG's immediate memory for both visual designs and stories was moderately impaired. He was unable to recall any visual designs or story detail after a 30-min delay. JG's performance on the Differential Verbal Learning Test suggests some ability for new learning with repetition but unfortunately a tendency to erroneously learn information that was not presented. On Wechsler Adult Intelligence Scale (Revised), JG achieved a verbal IQ of 83, a performance IQ of 71, and a full-scale IQ of 78. His performance on Wechsler Memory Scale (revised) suggests moderately impaired levels of orientation to personal and current information. On the Folstein Mini-Mental State exam, he scored 20 of 30 possible points. This level of performance typically indicates mildly impaired functioning in older adults.

Materials and procedures. The subject was tested on Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1983), Boston Naming Test (Kaplan, Goodglass, Wintraub, & Segal 1983), Discourse Comprehension Test (Brookshire & Nicholas, 1993), Discourse Production Task (Wyckof, 1984), and Linguistic Ambiguity Comprehension Test (Balasubramanian, 1987). Following the standard procedures described in the test manual, the Boston Diagnostic Aphasia Examination (BDAE) and the Boston Naming Test (BNT) were administered in the first session of testing. The primary purpose of using BDAE and BNT with this case was to identify aphasia or aphasia syndrome, if any. The three experimental tasks of this study are described below.

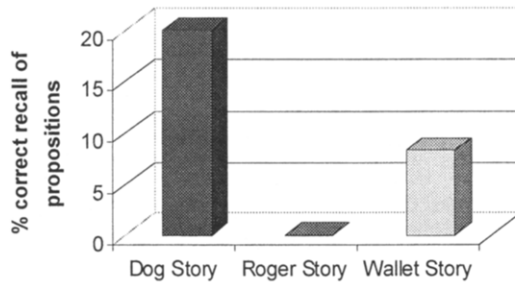
The Discourse Comprehension Test (DCT) is a test designed to measure discourse comprehension using stories. This test includes two sets (A and B) of stories, each having five stories. The mean number of words included in these stories was 205.6. The mean number of sentences in the stories was 14.0. The mean sentence length was 14.7. Only stories from Set A were read to the subject. Following the presentation of each story, the client answered eight questions. These questions examined stated main idea, implied main idea, stated details, and implied details. Each correct answer was given one point.

The Discourse Production Task (DPT) involved immediate verbal recall of three short stories that were read to the client by the researcher. These stories contained 10 to 15 propositions. Following the presentation of each story, the client verbally recalled the story. The number of propositions recalled from each story was counted.

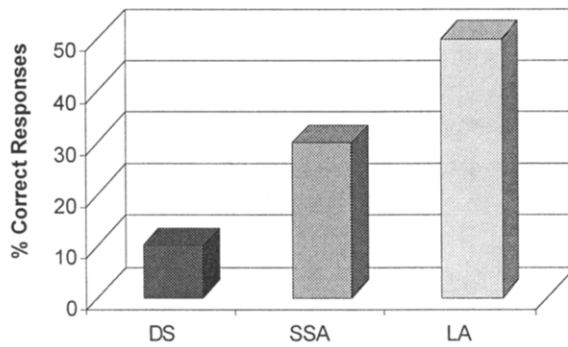
The Linguistic Ambiguity Comprehension Test (LACT) is a test that includes three sets of sentences and each set includes 10 ambiguous sentences. Three types of ambiguity, namely, lexical (LA), deep structure (DSA), and surface structure (SSA), were represented by the three sets of sentences. This test used sentence-picture matching task. For each of the sentence (LA, The man lifted the trunk; DSA, Flying planes can be dangerous; and SSA, The woman told her baby stories) the client saw four pictures. Two of these pictures represented the two meanings of an ambiguous sentence and the remaining two were foils. On hearing the ambiguous sentence, the client had to choose two of these pictures that represented the two meanings. For each correct response, the client was awarded one point. For all these experimental tasks (DCT, DPT, and LACT), the subject received appropriate instructions that explained the tasks.



Patient's performance on Discourse Comprehension Test



Patient's performance on immediate recall of propositions in Stories



Patient's performance on Linguistic Ambiguity Comprehension Test

FIG. 1. JG's performance on language production and comprehension tasks.

Results

On BDAE and BNT, the subject's performance did not indicate the presence of aphasic syndrome. In fact, JG's performance on auditory comprehension of short paragraphs corresponded to percentile 70.

On DCT, the subject's performance was moderately impaired. The subject's recall of stated main idea (score, 4), implied main idea (score, 4), stated detail (score, 4), and implied detail (score, 4) was well below the mean scores (10, 9.9, 9.3, and 8.2, respectively) and cutoff scores (10, 9, 8, and 6, respectively) reported for 40 adult control subjects (Brookshire & Nicholas, 1993). With a score of 4 for each component, JG's overall score on the DCT was 16. The overall scores reported for the adult control subjects is 37.4; the cutoff overall score is 35 (Brookshire & Nicholas, 1993). JG's performance on DCT was also found inferior to that of other clinical populations such as the Huntington's and Parkinson's patients (Murray & Stout, 1999). Unlike the normal controls and Parkinson's and Huntington's groups, JG's level of performance in all four areas of DCT was symmetrical.

During the DPT, JG could not recall even a single proposition from the presented story, resulting in a score of 0. This same story had been used previously in a study of discourse production in head trauma patients (Wyckoff, 1984). In that study, the mean score for normal controls ($N = 11$) was 11.38.

On the LACT, JG's performance was well below the mean scores previously obtained for eight normal controls (Balasubramanian, 1987). For those normal controls, mean scores for the three kinds of ambiguous sentences were as follows: LA = 10, SSA = 7.75, and DSA = 9.50 (Balasubramanian, 1987). JG's scores were as follows: LA = 5, SSA = 3, and DSA = 1 (see Fig. 1).

Discussion and Conclusion

JG's symmetrical pattern of performance on DCT appears to confirm the observation that ACoA syndrome is associated with a profound deficit of recall from long-term memory. On the other hand, a predominantly language processing problem could be expected to result in asymmetrical performance, so that a subject may be able to perform better on MIS than on MII and so on. Conscious recall of stories also appears to be influenced by JG's impaired long-term memory. However, JG's performance pattern on the LACT leads to the conclusion that aspects of language/semantic representation may be impaired. This conclusion is supported by the fact that JG's comprehension of lexical ambiguity was at 50% accuracy level. This task allows the subject to rely the least on memory. The fact that more abstract tasks of LACT (DSA and SSA) were performed poorly by JG can be related to impaired language processing as well as working memory impairment. With limited data obtained from a single subject, it is difficult to clearly disentangle language processing from memory problems. Further research is warranted. On the other hand, from a different theoretical perspective, one can argue that "no memory-specific processes exist independently of mechanisms and processes that have evolved for learning, comprehending, and producing language" (MacKay & Abrams, 1996, p. 261).

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Global Cognitive Decline in Schizophrenia with Remission of Symptoms?

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The relation of symptoms to cognitive dysfunction in schizophrenia is still controversial. This study was aimed (i) at verifying if a homogeneous sample of 10 young treated outpatients in remission from psychotic symptoms displays a characteristic pattern of cognitive dysfunction and (ii) at testing the issue of a general cognitive impairment. The neuropsychological performance of the patients was confronted with a large control group by means of Equivalent Scores, a normative method widely used in Italy, which allows direct, reliable comparison between tests and between patients. We found that our patients, as a group, were affected by a basic activation deficit in attention and by a semantic impairment. These deficits in symptom-free patients could indicate that their brains are in some ways working differently from those of normal controls and that this pattern is not necessarily linked to psychotic symptoms: their neuropsychological impairment might reflect a basic difference in the way of processing information that is always present and is independent of general intellectual decay. © 2001 Academic Press