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Source memory deficits in aphasic and healthy aging speakers of Turkish

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Introduction

Source memory or *source monitoring* refers to the processes of encoding, storing, and retrieving from where and which sources a piece of particular memory was gained (Johnson, Hashtroudi, & Lindsay, 1993). Neuropsychological studies on frontal lobe patients and healthy aging adults have shown that the source memory is vulnerable (Glisky, Polster, & Routhieaux, 1995; Janowsky, Shimamura, & Squire, 1989; Swick, Senkfor, & Van Petten, 2006). However, few studies tested patients or aging adults in languages other than English. Turkish grammar, for instance, requires speakers to indicate whether past events were 'seen' directly or 'heard' through a third-person report. A recent study has shown that Turkish agrammatic speakers were more impaired in producing 'seen past' than 'heard past' verb forms (Arslan, Aksu-Koç, Maviş, & Bastiaanse, subm.). However, identifying whether the information was received through the 'seen' sources was better than through the 'heard' sources, suggesting that the agrammatic speakers might not monitor the information sources mapped onto seen/heard past verb forms accurately. Therefore, the current study addresses whether monitoring the sources of memories is impaired in the aphasic patients and healthy aging speakers of Turkish.

Methods

Participants

We tested three groups of participants: eight aphasic patients (three fluent patients: two females, M*age* = 55.6; five non-fluent patients: one female, M*age* = 59; post-onset > eight months), fifteen younger non-brain-damaged individuals (NBDs; nine females, M*age* = 26.4), and five elderly healthy aging NBDs (4 females, M*age* = 54.2).

Materials and Procedure

The source monitoring task in Arslan, de Kok, and Bastiaanse (in progress) was used. Stimuli included eighty meaningful inanimate objects. Forty objects were represented as black-white line drawings (seen items). The other forty objects were audio recorded as spoken words (heard items). All the stimuli were concrete nouns. The experimental design included two phases: 'study' and 'test'. At the study phase, all eighty objects were presented. The seen and heard items were presented as separate blocks counter-balanced across the participants. At the test phase, a subset of forty items from the study list (twenty seen items and twenty heard items) was presented as 'old items'. An additional set of forty items was used as 'new items'. All the items in the test phase were presented as written words. For each test item, the participants had to respond to 'old/new' and 'source monitoring' judgments. First, they had to judge whether a test item was from the study list or not. This is referred to as 'old/new recognition'. If the participants judged an item 'old', subsequently, they had to decide whether it was a seen or heard item. This is referred to as 'source monitoring'. Source monitoring responses were scored when the items were recognized correctly in the old/new judgment.

Results

Old/new recognition

Non-parametric tests were used to analyze the data. The aphasic individuals scored lower in old/new recognition than the elderly NBDs (z = -3.437, p = .001), and the younger NBDs (z = -6.221, p > .001), see Table 1. The elderly NBDs did not differ from the younger NBDs (z = -1.566, p = .117). Rejection of new items was more difficult than recognition of old items for the non-fluent aphasic individuals (X^2 = 15.068, df = 1, p > .001); and for the elderly NBDs (X^2 = 6.273, df = 1, p = .012). In the fluent aphasic individuals, however, there was not such a difference (X^2 = .311, df = 1, p = .577). The younger NBDs showed the opposite pattern of the non-fluent aphasic individuals and elderly NBDs: they were better in rejecting the new items than recognizing the old items (X^2 = 24.624, df = 1, p > .001).

Source monitoring

Source monitoring performance of the aphasic individuals was reduced compared to the elderly NBDs (z = -3.418, p = .001) and the younger NBDs (z = -7.347, p > .001). Comparably, the elderly NBDs performed lower than the younger NBDs (z = -2.547, p = .011), see Table 1. Recalling source was better attained for the seen than for the heard items in non-fluent aphasia (X^2 = 57.063, df = 1, p > .0001); in fluent aphasia (X^2 = 8.120, df = 1, p = .004); and in the elderly NBDs (X^2 = 6.033, df = 1, p = .014). The younger NBDs, however, did not differ in recalling sources for seen or heard items (X^2 =1.286, df = 1, p = .257).

Discussion

We showed that old/new and source monitoring judgments were affected in fluent and non-fluent aphasia compared to the younger and elderly NBDs. The elderly NBDs also differed from the younger controls in making source monitoring but not old/new judgments. The non-fluent aphasic individuals were more affected in making source monitoring judgments for the 'heard' items than for the 'seen' items, although the results of the fluent aphasic individuals and elderly NBDs pointed to the same direction. Our results, thus, confirm earlier neuropsychological studies, and indicate that lesions leading to fluent and non-fluent aphasias, as well as healthy aging, affect source monitoring judgments. Our data indicate a similar direction of source identification deficits as in Arslan et al. (subm.) who showed the agrammatic speakers of Turkish cannot attribute information sources to the seen/heard past verb forms. We argue that source confusions in Turkish non-fluent aphasia may be due to source memory deficits.

References

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Table 1. Mean recognition and source monitoring accuracies *(SDs)* of the participants

	Old/new recognition			Source monitoring		
	Old	New	Total	Seen	Heard	Total
Younger NBDs	.71*(.45)*	.83*(.37)*	.77*(.41)*	.89*(.31)*	.86*(.35)*	.88*(.33)*
Elderly NBDs	.79*(.40)*	.68*(.46)*	.74*(.43)*	.86*(.34)*	.70*(.46)*	.79*(40)*
Non-fluent aphasia	.70*(.45)*	.51*(.50)*	.61*(.48)*	.74*(.37)*	**.19*(.39)***	.54*(.50)*
Fluent aphasia	.68*(.47)*	.71*(.45)*	.69*(.46)*	.91*(.29)*	.65*(.48)*	.79*(.41)*
Aphasia total	.69*(.46)*	.58*(.49)*	.64*(.48)*	.86*(.35)*	**.36*(.48)***	.63*(.48)*