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Structural priming of active and passive sentences in Italian speakers with Aphasia

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Introduction

Structural priming is the tendency for speakers to produce previously processed sentence structures, even when the structures are syntactically more complex than equally suitable semantic alternatives (Bock, 1986; Pickering & Ferreira, 2008; Branigan & Pickering, 2016; Mahowald et al. 2016). Studies have found that structural priming results in facilitated access to primed sentence structures in speakers with agrammatic aphasia, thus raising the possibility that structural priming techniques can be used to retrain grammatical encoding processes in aphasia (e.g., Cho-Reyes et al., 2016; Hartsuiker & Kolk, 1998; Lee & Mann, 2017; Lee et al., 2019; Rossi, 2015; Saffran & Martin, 1997; Verreyt et al., 2013; Yan, Martin, & Slevc, 2018). At the same time, not enough is known about how structural priming works in aphasia, nor what individual patient profiles are associated with susceptibility to priming. The aims of this study are to begin to investigate structural priming in Italian speakers with aphasia including a sample of speakers with aphasia types and to relate priming to patient characteristics.

Methods

Participants

Participants were eight PWA resulting from a left hemisphere CVA. They were assessed with the Italian version of the Aachener Aphasia Test (Luzzatti et al., 1996), written and spoken sentence comprehension tasks, confrontation naming and picture description, written and spoken grammatically judgment tasks (from Batteria per l'Analisi dei Deficit Afasici; Miceli et al., 1994) and reversible passive comprehension (from Psycholinguistic Assessment of Language Processing in Aphasia; Kay et al., 1996). Participants were right-handed, had no visual or hearing impairments nor prior neurological or speech-language disorders.

Design, materials and procedure

The experiment was split into primed and non-primed elicited production in two different sessions on separate days. In the primed session speakers described target pictures after having heard and repeated a prime sentence, in the non-primed session they simply described pictures. Participants were assigned to one of two groups: primed sentence production on session one followed by non-primed sentence production on session 2 and vice-versa. For the primed session 32 transitive prime sentences (half actives, passives) were paired with 16 target pictures. Prime and Target pictures were scene sketches of

transitive events with inanimate agents (e.g., rock) and animate patients (e.g., man). Verbs were repeated across prime and target pairs, but participants always varied. Targets had the infinitive form of the verb written below. Prime sentences were audio-recorded and played via headphones. Participants repeated each prime sentence and described each target picture. The experiment was presented with Psychopy software (Peirce, 2007).

Results and discussion

Participants' descriptions were transcribed and coded using strict scoring criteria for active and passive. Only full passives with the correct passive morphology (past participle agreeing with the gender and number of the grammatical subject plus by phrase) were included in the strict scoring, however null subjects were allowed. We analyzed the data with a logistic mixed-effects model (Baayen, Davidson, & Bates, 2008) in the lme4 package in R (Bates, 2010), predicting the logit-transformed likelihood (log odds) of target structures (Log odds Passive/Active) with Prime Condition (Active Prime, Passive Prime, No Prime), Group and their interaction as fixed effects. At the group level PWA showed evidence of structural priming: on average they produced more passive sentences after passive primes than after active primes. Our results indicate that structural priming is effective in Italian speakers with aphasia. This adds to the growing body of research that finds that priming in speakers with aphasia facilitates access and use of primed sentence structures. At the same time, individual patient characteristics resulted in greater or lesser susceptibility to priming: One participant never produced passives and one participant always produced passives. The participant who failed to produce passive during the two-session priming experiment was a chronic agrammatic speaker who also scored poorly on the reversible passive comprehension task. In a follow up eight session priming intervention this participant showed increased production of grammatically transitive sentences and one full passive. Taken together our results are consistent with a processing account of the linguistic deficits in aphasia (Thompson et al., 2015) and open up the possibility of using interventions based in structural priming paradigms in language rehabilitation, across aphasia types.

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