

# **An investigation of the use of co-verbal gestures in oral discourse among Chinese speakers with fluent versus non-fluent aphasia and healthy adults**

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## Introduction

Co-verbal gestures can facilitate word production among persons with aphasia (PWA) (Rose, Douglas, & Matyas, 2002) and play a communicative role for PWA to convey ideas (Sekine & Rose, 2013). Kong, Law, Kwan, Lai, and Lam (2015) recently reported a systematic approach to independently analyze gesture forms and functions in spontaneous oral discourse produced. When this annotation framework was used to compare speech-accompanying gestures used by PWA and unimpaired speakers, Kong, Law, Wat, and Lai (2013) found a significantly higher gesture-to-word ratio among PWAs. Speakers who were more severe in aphasia or produced a lower percentage of complete sentences or simple sentences in their narratives tended to use more gestures. Moreover, verbal-semantic processing impairment, but not the degree of hemiplegia, was found to affect PWAs' employment of gestures.

The current study aims to (1) investigate whether the frequency of gestural employment varied across speakers with non-fluent aphasia, fluent aphasia, and their controls, (2) examine how the distribution of gesture forms and functions differed across the three speaker groups, and (3) determine how well factors of complexity of linguistic output, aphasia severity, semantic processing integrity, and hemiplegia would predict the frequency of gesture use among PWAs.

## Method

The participants included 23 Cantonese-speaking individuals with fluent aphasia, 21 with non-fluent aphasia, and 23 age- and education-matched controls. Three sets of language samples and video files were collected through the narrative tasks of recounting a personally important event, sequential description, and story-telling, using the Cantonese AphasiaBank protocol (Kong, Law, & Lee, 2009). While the language samples were linguistically quantified to reflect word- and sentential-level performance as well as discourse-level characteristics, the videos were annotated on the form and function of each gesture. All PWAs were also administered tests that assessed their verbal and non-verbal semantic skills, oral naming abilities, aphasia syndromes and severities, and degree of hemiplegia.

## Results

For Aim 1, results of Kruskal-Wallis tests revealed that the gesture-to-word ratio was significantly different across speaker groups,  $H(2) = 20.13$ ,  $p < 0.001$ . Post-hoc analyses using Mann-Whitney tests revealed a significantly higher ratio in the non-fluent aphasic group (mean = 0.27, SD = 0.23), as compared to the fluent PWAs (mean = 0.10, SD = 0.12) and controls (mean = 0.04, SD = 0.05).

Concerning Aim 2, deictic gestures were the most frequently used form of content-carrying co-verbal gestures by PWA and controls. Emblems, in contrast, were used the least. About half of the gestures employed did not serve a specific communication function in our speakers, but a higher proportion of the remaining half was used by controls to enhance the speech content. Both fluent and non-fluent PWAs, on the other hand, tended to use gestures to enhance the speech content and assist their lexical retrieval.

As for Aim 3, results of a multiple regression suggested that PWAs' discourse performance was significantly related to gesture to word ratio,  $F(1,39) = 12.955$ ,  $p < 0.01$ . Specifically, percentage of complete sentences and percentage of dysfluency significantly accounted for 24.9% and 14.2% of variance, respectively.

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