

The Author Reply

Re: Lateralization of Cognitive Functions in Aphasia after Right Brain Damage

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Received: March 6, 2013

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· The author has no financial conflicts of
interest.

We thank you for your review and comments on our article entitled “Lateralization of cognitive functions in aphasia after right brain damage”.¹ We appreciate the opportunity which made us to think about the neural and behavioral handedness.

First, I want to discuss the behavioral handedness in Korea. Traditionally, using the left hand dominantly has not culturally been accepted in Korea, although it is not as serious as used to be. Ida and Bryden² reported many more right-handed people among Orientals than Caucasians, and suggested cultural pressure as an important factor. Korean culture has dominantly forced left-handed people to use their right hand from childhood, and those with natural left handedness have eventually been corrected to be right-handed. Korean parents and teachers make children eat using the right hand by referring to the right hand as ‘the hand for eating’ when teaching right and left directions. As a result, the use of the right hand while eating and writing is predominant in Asia.² These predominant manual preferences may switch to the other hand through intensive motor use³ and it is the same context as your reference to ‘behavioral handedness’. Case 3 used his left hand while eating and writing despite this cultural characteristic, thus raising the possibility of his being left-handed naturally and neurally, not behaviorally.

You raised a question that the verbal comprehension ability in Case 3 was preserved. If you closely examine Table 1 in our paper,⁴ you will find that the scores for comprehension in Case 3 are 42 out of 60 for yes/no questions, 35 out of 60 for auditory word recognition, and 11 out of 80 for sequential commands, examined by Korean version of Western Aphasia Battery (K-WAB). The overall score is 4.4 when the perfect score is converted into 10. This is considered as a score to indicate a rather good level of verbal comprehension ability in a patient with Broca’s aphasia, but this does not necessarily mean that the verbal comprehension ability is preserved. In comparison with the scores for verbal comprehension in the other cases (Case 1 and 2), the score in Case 3 was lower than that of Case 1, but higher than that of Case 2. The classification of aphasia subtype is somewhat arbitrary, and auditory comprehension is not ‘preserved’ but ‘relatively better than other language domains’ in most cases with Broca’s aphasia. In addition, Case 3 showed extremely low scores in language domains than verbal comprehension by K-WAB: 0.5/10 for fluency; 0.2/10 for repetition; and 0/10 for naming. These profiles are not likely of mutism or anarthria caused by a minor (right) hemispheric infarction, but suggestive of aphasia affecting language. Fortunately, we had an

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opportunity to conduct K-WAB about 4 years after the onset of stroke (April 2011) in Case 3; his linguistic ability improved slightly (2/10), but not much changed in terms of verbal comprehension (4.4/10), repetition (0.3/10), and naming (0.3/10) since the time of the experiment. Thus, we are confident that Case 3's poor expressive linguistic abilities indicated aphasia. This was not a temporary symptom resulting from diaschisis, because diaschisis usually resolves within several months after brain injury.⁵ To sum up, we are certain that Case 3 had aphasia after right hemispheric damage, and this was not likely due to the result of diaschisis after extensive minor hemispheric injury related to his left-handedness.

Nevertheless, your idea of distinction between neural and behavioral handedness is very interesting, particularly in relation to our field of interest, the lateralization of cognitive function. Close special attention is required to diagnose crossed aphasia because patients who have been judged to be right-handed may actually be neural left-handed, especially for Oriental countries like Korea. It is necessary to recheck the validity of the handedness test that depends solely on reports from patients and their caretakers. Furthermore, if

naturally left-handed people constantly use their right hand from childhood, we cannot exclude the possibility that this influences the lateralization of cognitive function including language. Finally, it is highly possible that there are differences in brain laterality between cultures with pressure for the use of the right hand and ones without such pressure. We suppose that these topics are worth studying in future.

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