CHAPTER 6

SUMMARY & IMPLICATIONS
A plethora of clinical observations and group studies have firmly established the association between the left hemisphere and language function over the last 150 years. Since the seminal proposals of Broca in 1860s, the LH was presumed to be the sole linguistic processor for almost a century. However, in 1960s, the clinical studies on split-brain subjects provided evidence for the linguistic processing capabilities of the right hemisphere. Ever since then, there have been several investigations aimed at exploring the RH’s role in linguistic processing through various techniques, methods, and paradigms employed in both normal and a variety of clinical populations. Among the linguistic functions, the lexico-semantic processing skills of the right hemisphere have attracted considerable research attention with mixed evidence emerging from the previous investigations.

Although several techniques such as divided visual field studies have provided supportive evidence for the RH’s role in lexico-semantic processing from certain clinical populations like commissurotomees, the pioneers in this line of research have identified the potential of investigations in people with right hemisphere damage with an intact ‘linguistic’ left hemisphere in right-handed subjects. The current study, therefore, investigated lexico-semantic processing skills in a group of subjects with RHD.

Acknowledging the fact that previous research employed a variety of tests to investigate the lexico-semantic skills in this population, and such tests were not available in the language of current investigation (Kannada), a comprehensive test battery was developed to examine lexical retrieval skills. Based on an extensive literature search, 21 tasks grouped under two major categories (convergent & divergent) were included in the test battery.

Given that this battery was not standardized, a case-control design in which the performance of the clinical population was matched with age-, gender-, and literacy-matched neurologically normal subjects in a control group was the current study. A scoring criterion distinct from those used in the tests for assessment of aphasia subsequent to LHD was used. The delayed correct responses – those responses after the allocated initial response time or subsequent to the provision of cues – were not included in the group comparison to make the tasks more sensitive to the arguably subtle lexico-semantic processing deficits associated with
RHD. Such a stringent criterion was employed considering the fact that these skills were assessed in subjects with intact left (linguistic) hemisphere.

In the convergent tasks, performance of the clinical group (i.e., subjects with RHD) differed significantly from that of the control group in all but one task. The only task that failed to show significant difference between the two groups was definition-naming. The lack of difference between the two groups on this task was attributed to the nature of the stimuli used in this task (facilitating the progressive semantic convergence to the target lexical item). Further, similar performance by both groups on the definition-naming task was interpreted as being supportive of the suppression deficit hypothesis, one of the prevailing hypotheses of lexical retrieval difficulties in subjects with RHD.

The current study provided insights into certain unexplored domains of linguistic research. Specifically, the performance on antonym- and synonym-generation tasks showed that both clinical and control participants performed better in the former tasks, although there was a significant difference in the group means of these tasks. This observation, therefore, signified that antonymous words are processed more efficiently than synonymous words, and it calls for further research in this regard. Additionally, the study also highlighted certain terminological issues observed in the literature. That is, the terms ‘definition-naming’ and ‘responsive-naming’ have been found to be used interchangeably in the literature. Based on the results obtained in this study of a sharp difference in performance on the two tasks, by the clinical and control groups, it is advocated that these two terms should not be used interchangeably.

The control participants often failed to exhibit a ceiling effect in several convergent tasks in the current study. This was attributed to the stringent scoring criterion employed in the study as well as to the overall low literacy level of the participants. The lack of ceiling effect even in the control participant was partly due to the skewed distribution of the population with respect to their literacy level.

With respect to the divergent tasks that included semantic and phonemic criteria, the clinical group retrieved significantly fewer items under both criteria compared to the control group. Further, the qualitative analysis (i.e., switching & clustering) of the responses in these
tasks showed that the clinical group produced significantly smaller clusters in the semantic criterion, although their cluster size was similar to the control group in the phonemic criterion. The analysis of switches did not reveal any significant difference between the two groups and tasks. Together, these results showed that in comparison to the control group, the subjects in the clinical group retrieved fewer exemplars in the semantic and phonemic conditions and smaller cluster size in the former, although not in the phonemic condition. The absence of difference in the mean number of switches between the two groups indicated that the cognitive search strategies in the clinical group was similar to that of the control group, further highlighting the impaired lexico-semantic processing as the source of poorer performance in the clinical group.

The time course analysis in the verbal fluency task revealed that both clinical and control groups showed a similar trend of retrieving maximum exemplars in the initial and minimum in the final quadrants of 60 seconds duration, although the latter group retrieved significantly more number of items under both semantic and phonemic conditions. The lack of significant difference between the two groups in terms of switches, does not lend support to the hypothesis of ‘less automatic exploration’ of the semantic field as the possible mechanism behind reduced exemplar generation during the response period, thus favouring the ‘discrete semantic impairment’ hypothesis.

To conclude, the comparison of the performance of 22 subjects with right hemisphere damage with that of an equal number of age, gender, and literacy-matched neurologically normal control participants, on a comprehensive battery of lexical retrieval tasks showed that the former group exhibited lexico-semantic processing deficits. Thus, the present study provided evidence for the role of right hemisphere in lexico-semantic processing. Additionally, the study advocates the use of comprehensive batteries with stringent scoring criteria such as the ones used in the present study in the assessment of lexical-retrieval skills of subjects with RHD.