



CHAPTER V

SUMMARY AND CONCLUSION

Two inter-supporting experiments were performed for investigation on natural mechanism of speech perception, focused at the economy of encoding process for noun and modifiers in the right-hand-branching language. There were three assumptions underlay the hypothesis and paradigm. The first assumption was derived from the information processing model and the duplex theory in which the nonsensory memory was divided into two stores, i.e., the short-term (STM) and the long-term memory (LTM). The second assumption based on the limited capacity of STM with average size of 7 ± 2 chunks. The third assumption based on the chunking process in which stimuli could be grouped and stored in a chunk unit. The derived hypothesis states that the modifier position in verbal language can effect semantic encoding process in STM in the way that chunking economy will be different because of the mechanism which is serial and delayed when the modifier precedes noun, but when the modifier follows noun, the mechanism is instantaneous; thus the latter provides more efficient code in speech perception which results both in speed and accuracy.

In experiment I, based upon displacement hypothesis, verbal presentation of a noun with three modifiers in varied positions of twenty four patterns of which each one was followed by a string of random digits exceeding memory span, were randomly assigned to each one of twenty four subjects. Subjects were required to perform immediate serial recall

verbally after the presentation of every pattern. The recalled items were recorded in the provided answer sheet by the experimenter. In experiment II, based upon differential processing time hypothesis, reaction time of verbal-visual matching between the item consisted of a noun with three modifiers in varied positions and the corresponding pictures was in consideration for differential processing time of encoding process. A synchronized system of electronic apparatus was constructed and each one of another group of twenty four subjects performed the task for twenty four patterns which corresponded to the first experiment. Data from both experiments were reorganized into four patterns and analyzed by means of analysis of variance for single factor experiments with repeated measures on the same elements. Errors in the recalled items were analyzed by means of conditional error probability and position reversion analysis.

Results from both experiments apparently illustrates differential effect of modifier positions upon perception and short-term memory which results in reaction time and word recall capacity. It is noticeable that speed and accuracy of perception and recall are maximum for the item which noun precedes modifiers in verbal presentation, and where modifiers precedes noun, speed and accuracy decrease approximately in a linear function to the numbers of modifiers prior to noun. Furthermore, positional recall probability and position reversion analysis co-suggest a reorganizing mechanism which occurs in STM and can be interpreted as a syntactic reorganization in the view of psycholinguistics on one hand, or it can be interpreted as perceptual unit reorganization of information of speech signal in the view of information processing model on the other hand.

Inevitably, the syntactic reorganization or perceptual unit reorganization in STM is operated by the derived strategies and techniques from LTM. Thus LTM does involve in the encoding mechanism in STM and crucially determines the economy of chunking process. Supporting by the conditional error probability analysis, it is apparent that the error results from the failure of instantaneous chunking, therefore the acoustic codes are impeded into the reorganization loop which is able to retain and process merely a constant number of code units at a time. This is the limited capacity of STM with an average size of 7 ± 2 perceptual units or in Miller's term, chunks. The more times the codes circulate in the loop, the more probable the codes interfere (or are interfered by) the newly acoustic encoded codes which are excessive in the loop. The circulation of the codes in the loop is identical to the covert behavior which is described by the subjects in the term of "rehearsal". If such codes do not match to the internal semantic and syntactic operation, they will not be semantically encoded and the process is discontinued; thus there is no chunking at all, and no codes enter the storage in LTM.

To assume a propagating neuronal circuit resulted from learning experience to be responsible for an internal code operation, the previously proposed mechanism of encoding process in speech perception is nothing but simply an operation of the logic gates of the neuronal circuits. This extrapolated speculation is verifiable through an interdisciplinary approach such as neuro-psycho-linguistics and computer simulation. Unquestionably, the interdisciplinary approach research

will provide more understanding about the nature of human memory and perception of speech and produce more comprehensive way of telecommunication in its ergonomical application.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย