

# Think-Aloud Method: An Examiner and a Tool for Improvement in Reading Comprehension in Qualitative and Quantitative Research

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## Abstract

*Think-Aloud is a research method that has gained reputation in the last few decades in both quantitative and qualitative research approaches. This is because think-aloud offers a better view of the mental processes in which the participants are engaged as they speak aloud any words in their minds while completing a task. In the present paper, the role of this method in two different-designed researches on reading comprehension will be analyzed. Findings will show that Think-Aloud method served in both studies as an examiner of mental processes during the reading tasks and as a tool for improvement of reading comprehension skills; demonstrating the versatility and appropriateness of this method in First and Second Language Research.*

**Keywords:** Think-Aloud, Quantitative and Qualitative Research, Reading Comprehension. First and Second Language Research

## INTRODUCTION

### An introduction to Think-Aloud method

Originally developed by Newell and Simon (1972, cited by Block, 1986), this method was used to study problem-solving strategies. Having in mind that problem-solving is a cognitive process where one should answer a question “for which one doesn’t directly have an answer available” (Someren, 1994, pp. 8), the reason for choosing this kind of activity for the application of Think-Aloud is crystal-clear as the tasks given to the participants must be suitable for the Think-Aloud occur as naturally as possible. Thus, tasks with a “high cognitive load” may interfere with verbalization while tasks too simple may produce automaticity and “as the closer readers’ activities come to automaticity, the more problematic it may be for readers to describe these automatic or near-automatic happenings” (Pressley & Afflerbach, 1995, pp. 132).

Hereinafter, the application of Think-Aloud was expanded to a more naturally verbal kind of tasks (Ericsson & Simon, 1980), or processes that

produce intermediate thoughts that can be verbalized (Someren, 1994, pp. 8), perhaps conforming to Vigotsky's "inner speech" theory. In his work *Thought and Language* (1962), Vigotsky claims that internal verbalized adult thought processes are the product of the evolution of egocentric monologues of toddlers as a response to the need of solving more challenging problems. Besides that, he points out the unique capacity of human beings of thinking about "one's own thinking"; capacity that is a crucial component in learning processes.

In education, this metacognitive awareness enables learners to access their own in-depth thought processing, allowing them to have a clearer picture of their learning strengths and weaknesses and, therefore, being able to "assess their level of comprehension and adjust their strategies for greater success" (Jahandar, Khodabandehlou, Seyedi & Abadi, 2012).

Although thinking-aloud has proved to be theoretically accurate and an effective tool in the understanding of human's thought, the complexity, variety and depth of human thought itself calls for a major effort in the collection of data and its interpretation from the part of both researchers and participants. The goal of Think-Aloud is to give to researchers an insight of internal processes of working memory. However, there are several difficulties investigators should be aware of. First of all, a great amount of our thoughts are not stored verbally since meaning goes beyond words and "there are many non-linguistic ways in which many aspects of the world are represented" (Zambrano, 2016, pp. 5). This is why a speaker often takes several time to disclose his thoughts. Due to the lack of an automatic counterpart in words for every thought, the mind experiences the transition from thoughts to words, from words to meaning and, finally, from meaning to words. (Vygotsky, 1962, pp. 150). During this process, much of the true complexity of thinking is not revealed for many thoughts are simplified to be transmitted into words and the quickness and limited capacity of the working memory may produce the loss of significant information as it "can disappear as soon as new thoughts supersede it" (Charters, 2003).

In addition, many thought processes are not verbalized in working memory either because "they are automatic (such as recognition of familiar words and images) or because their "intermediate" processing passes through so quickly that there is no time to verbalize it (Davis & Bistodeau, 1993, Ericsson & Simon, 1980, Sugirin, 1999).

Moreover, because of the "elliptical" nature of inner speech or, in other words, the fact that thoughts are not commonly expressed in complete, reasoned sentences dominated by predicates, as they are not intended to be communicative to anyone but to the thinker, the data from Think-Aloud protocols might be fragmented and "interpretative-challenging". Apart from that, many of the utterances from participants might be ambiguous and

confusing, even for the participant himself for the request of indirect verbalization might change the way they think, as Charters (2003) remarks:

“Given that inner speech is “elliptical” or telegraphic, forcing students to produce complete sentences or artificially joining fragmented utterances into grammatically complete “communication units” may lead to misrepresentation of thought processes. Also, assigning each “communication unit” to one cognitive strategy oversimplifies the process; in reality, one utterance may reflect a more complex combination of strategies (Rankin, 1988).” (pp. 76).

Finally, some other kind of cons might be implied in the use of Think-Aloud method, namely, its expensive cost, its time consuming nature (see also Pressley & Afflerbach, 1995), its limited possible application to a small-sized sample (Johnson, 1992, p. 71) and its cognitive demand of use from researchers as well as from participants.

However, in spite of all of the mentioned limitations and challenges faced when using Think-Aloud method, as Olson et al., (1984) express, using this technique is one of the most effective ways to access higher-level thought processes and study individual differences in performing the same task. Its effectiveness and veracity will rely, then, on the adequate designing of a research plan where the type and level of difficulty of the task, the appropriate degree of prompting, and the use of other data to support Think-Aloud analysis would be carefully determined beforehand. Apart from that, what is more, the researcher might need to interpret not only the direct data obtained from verbalization , but also some para-linguistic and corporal features such as prosody, volume, intonation and gestures that may be clue for attaining the most assertive interpretation of the on-going process.

For all these reasons, Think-Aloud might be more effectively interpreted using a qualitative approach rather than a mere regular quantitative view, for it brings flexibility to the analysis and provides a clearer account of individual experiences (Charters, 2003).

## **Applying Thinking Aloud- principles and suggestions**

### **Preparation**

As Ericsson and Simon (1980) mentioned, the regular practice of an activity might produce atomicity and, thus, a quicker mental response. For this reason, the following measurements should be taken beforehand to accomplish success. Firstly, the researches should select the task carefully. Physical actions or visual images, which are not rawly verbal, might be disturbed when participants try to translate them into words to respond to the demands of a Think-Aloud task. In addition, tasks should be either introduced gradually according to their level of difficulty in short units to

prevent the overload of working memory (Johnson, 1992) or accompanied by what Charters (2003) calls “environmental supports” in the form of written texts which can help free up space in the working memory to attain high-level thinking.

Secondly, verbal reports should be rapidly followed after the target process is performed in order to reflect conscious thought. That is why the use of tape and video recorders as well as field diaries is strongly recommended.

On the other hand, due to the novelty of the method, some previous demonstration and practice is firmly suggested. Ideally, participants in Think-Aloud method should enunciate their inner speech spontaneously. However, this rarely occurs because the act of speaking aloud about one’s own thoughts is not a natural process itself, far less when this is done in the presence of an observer/examiner.

### **During Think-Aloud process**

The researcher’s coaching during the participant’s performance is crucial for the accuracy of the Think-Aloud interpretation. While omissions and pauses might be commonly part of the process, students should be encouraged to speak out what is going on in their minds. About the way of introducing this encouragement, there have been several techniques proposed. Some of them are the KEEP TALKING sign suggested by Sugirin (1999) in order to remind individuals to talk without addressing them directly in speech ; the conducting of a pre-task orientation session to prevent the “cold start effect” (Gibson, 1997. P 58); and the mere respect of participants’ silence for it depicts a more natural process; as Pressley and Afflerbach (1995) argued: “researcher silence about how the [task] might be processed is more defensible than directions that prompt particular processes, especially when the goal is to learn about the processes people naturally use” (pp. 132-133) .

As mentioned before, para-linguistic and corporal features might be taken into account for future interpretations. Thus, some researchers use video or audio tapes to record while others prefer only to handle an observation diary in order to avoid intimating the participant. Cullum (1998) and Fontana and Frey (2000) pointed out some important non-verbal cues for the analysis including pauses, periods of silence, pace of speech, variations in vocal tone and volume misreading, gestures and body movement in general.

### **After Think-Aloud implementation**

An appropriate triangulation is key to ensure the “reliability check” of the think-aloud method (Sugirin, 1999, pp. 2). On behalf of triangulation, there are various recommended methods to follow. One of them is called “retrospective analysis” or “retrospective questioning”. First proposed by Rankin (1988), this method is specially recommended for those participants

who have difficulties with the think-aloud method. Nonetheless, it is useful for any kind of individual since it helps develop the participants' capacity of reflecting on their thoughts and illuminates or expands think-aloud results by adding new information or adding depth to the previous one.

On the other hand, Qi (1998) suggested a follow-up interview in order to validate the researcher's interpretation/analysis of the results. For this later interview, Gibson (1997) claimed that it is better, first, to let the participants recall the task by their own and not to use the audio tape as a prompt and, second, to do the interview with a very short lag of time after the think-aloud recording. Others like Davis and Bistodeau (1993) combined both methods using the "recall protocol" to focus on the content of the task and the "exit interview" to work on the interpretation of the content (Charters, 2003, pp. 73). Others like Akyel and Kamisli (1996) simply supplemented the data with a questionnaire.

### **Two approaches to Think-Aloud method**

Researches such as Rankin (1988), Johnson (1992), and Jahandar, Khodabandehlou, Seyedi & Abadi (2012) have opted for a quantitative-like implementation and analysis of think-aloud method. The use of technological data gathering tools such as SPSS software and the execution of well-structured after-process protocols and interviews, as well as the statistical analysis of results, constitute a mark of this quantitative preference. By contrast, some other scholars, namely, Cullum (1998) and Charters (2003), favor a more qualitative approach over the regular quantitative view. Charters (2003) argues that a qualitative approach to think-aloud might be more suitable for this kind of methods due to the complexity of thinking process, the difficulty in the analysis of its data and the fluctuation of the different variables involved during the process.

Ericsson and Simon (1980) gave Think-Aloud name and fame among social scientists by affirming that "researcher inferences about the meaning of Think-Aloud utterances are as objective as behaviorists inferences about the purpose of visible actions and can be quantified with equal validity" (Charters, 2003, Pp. 79). Since the interference during the Think-Aloud process may result in the unreliability of the data collected, researchers should be prepared to make their own inferences for interpretation (Ericsson & Simon, 1980). Because of that, more unstructured tools and analysis are preferred in order to full benefit from this method. For instance, Fontana & Frey, 2000 suggest that unstructured interviewing might provide a greater amplitude of data than the other types. In addition, Creswell (1998) asserted that this type of researches is more effective when the researcher "develops categories from informants rather than specifying them in advance of the research" (p 77). Apart from that, Charters (2003) suggests to choose the

sampling group according to the interest of participants in the study rather than randomly or by a preselected range of backgrounds.

Even though the advantages of a qualitative approach to this method are numerous, the relevance and need of quantitative tools are undeniable. This is why a comparison of two researches on reading improvement is proposed to consider the applying of the think-aloud method from these two different angles.

### **Rationale of two researches using Think-Aloud method**

#### **Why using Think-aloud for assessing and improving reading skills?**

Think-aloud was chosen by Jahandar, Khodabandehlou, Seyedi & Abadi (2012) and Cullum (1998) first, to assess reading comprehension skills and, second, to determine the reading strategies and processes that were contributing to a good reading and the ones that were in need of development. According to Jahandar, Khodabandehlou, Seyedi & Abadi (2012), when the awareness of the student is arisen, then the student can comprehend the complexity of the reading process and identify his own weaknesses and strengths and, thus, more surely develop a conscious strategic plan for improvement:

“By talking about their own strategy use, students gain insights into the complexities of reading, and hence expand their understanding of what it means to be a "good reader." (pp. 2).

In Cullum’s (1998) words, there is no better way to know individuals’ reading processes of any reading level than by making them speak out about those internal procedures: “One of the primary ways of understanding reading processes is to ask readers--of any age or level of reading ability--to offer a verbal report of their thought processes as they read a text, either aloud or to themselves” (pp. 2).

However, any of the researches expected Think-Aloud to be more than a mere assessing tool. Jahandar, Khodabandehlou, Seyedi & Abadi (2012) formulated a null hypothesis in order to answer the principal research question of their study:

*Research question:* Does the Think-Aloud method have a reliable effect on EFL learners' reading comprehension proficiency?

*Null hypothesis:* Using the Think-Aloud method in a reading class has no significant impact on EFL learner's reading comprehension

For her part, Cullum (1998) mentions in the abstract the identifying role of Think-Aloud in her study: “A study examined the reading strategies of a "reluctant reader... a read-aloud, Think-Aloud protocol was used to determine which of the student's reading processes were serving her well and which were in need of development” ( Abstract).

Unexpectedly, at the end of the study, Jahandar, Khodabandehlou, Seyedi & Abadi (2012) concluded that Think-Aloud method plays an important role in reading comprehension as it helps get the cognitive process of the readers and hence, reinforce reading skills through strategic training. Cullum (1998) also found that after some practice with the Think-Aloud protocol, the sample student progressed “in her own meaning-making capabilities and took more pleasure in reading (Abstract) and that “the Think-Aloud procedure itself, with its enormous versatility, can also be an important tool into developing skilled and confident readers” (pp. 7).

In sum, both researchers found that think-aloud is an useful method that can provide not only an assertive evaluation of the mental processes , but that it also helps to improve certain capacities and skills in learners since it makes them reflect on their own thinking and be more autonomous apprentices.

Although the conclusion was similar, the approach to the method varied from one research to the other for Jahandar, Khodabandehlou, Seyedi & Abadi (2012) analyzed the results from Think-Aloud in a quantitative way using SPSS software while Cullum (1998) opted for a more qualitative approach by means of tape recording and personal interaction. Apart from that, the type of research, the kind of reading the students are exposed to and the treatment of the data varies significantly. A more detailed description and analysis of both researches is provided as follows (See comparative chart in Annex A for further details):

## **Comparison of both researches**

### **Research design**

Research 1 can be identified as a pre-experimental research. It was carefully constructor so chat “variables can be controlled and manipulated “(Seliger&Shohamy, 1999, pp. 135). The subjects were formed into groups according to their performance in the TOEFL exam, specifically in the reading comprehension section. The training three-month course was a controlled and intentional experience and its results were evaluated through a post TOEFL exam and the statistical analysis of data with SPSS software. The trained group was established as a representative sample of a large population.

Although the chosen groups were created , not naturally formed, this research might be seen as pre-experimental as the treatment (three-months course in reading comprehension) was administered to one group and its performance was compared with another similar one which received no treatment.

There are many advantages in the use of this design. First, this is an “economical “design to analyses the impact of a certain treatment in a chosen

sample. Moreover, about the design of the groups, both groups were designed according to an objective parameter (TOEFL scores) that, to a certain point, can be reliable to represent the learners' level of reading comprehension. Besides that, important variables such as sex, age and level in L2 were taken into account before the dividing into groups to attain to equity and homogeneity in the sampling.

On the other hand, this research could be also classified as a “pilot study” in the sense that it was used for preliminary testing of Think-Aloud as an instrument to improve reading skills.

Research 2 is with no doubts an example of a case study research. This kind of descriptive research involves “a collection of techniques used to specify, delineate, or describe naturally occurring phenomena without experimental manipulation” (Seliger&Shohamy, 1999, pp.124). The researcher's observation of a lack of interest in reading on behalf of her daughter was the prime motivation for the study to occur. However, it differs from a pure descriptive research in the sense that the data was not “collected first hand or taken from already existing data sources” (p p.24).

Although the researcher's daughter had already formed a reading habit due to her school demands, the researcher created, somehow, a special scenario to develop a “freer reading habit” by letting the child to choose by her own a book of her interest. The reading sessions were held at her house, in her dorm, creating a new friendly and relaxing environment. Even though the researcher might have tried before to make her daughter read some chosen books at home, this time the setting was purposely designed and the reading session intentionally pursued. In this respect, we might suggest that this is also a *quasi-experimental* study as it consists in the application of a given treatment to a specific sample that is lately tested and its impact on the sample's performance analyzed.

### **Data and data collection and procedures**

Seliger&Shohamy (1999) affirms that “the quality of any research study depends largely on the quality of the data collected, and the quality is directly related to the data collection procedures.” (pp. 153). This is why it is fundamental to evaluate the procedures taken in both researches to determine the validity of their findings and conclusions.

In Research 1, data derives from two main sources: first, the reading comprehension part of the TOEFL exam, and second, the performance of students during the training course sessions (e.g. problem-solving warm-up activities and think-aloud exercises) translated into observational comments in a presumable structured observation sheet.

About the data collection procedures, we must say that they are of a high degree of explicitness for they were determined in advance with a



specific focus. The subjects were constrained to be evaluated according to fix parameters on a metalinguistic test. In addition, regular observations were done in each of the sessions.

In Research 2, the tape recording and subsequent transcription of the Think-Aloud experience in every session as well as the researcher's journal constitute the foundations of the data. The information was gathered the first half of the sessions by the researcher herself while the other half was recorded by the student's little sister.

The researcher had a clear purpose in abandoning the scenario of the study for some time and leaving her youngest daughter to be the collector of data: to create an even freer environment for her oldest child and lead her to perform better in her Think-Aloud process. However, in this context, it might be possible to wonder about the ability of a 7-years old child for being a collector in a research; even if this is a case study and the subject of the study is her own sister. For instance, some natural and technical problems might occur during the gathering of information, namely, the absent-mindedness of the collector in a certain point of the sessions or the misuse of the tape recorder in any moment.

Furthermore, the objectivity of the researcher at the moment of collecting data could be put into question due to the close personal relation between her and the participant of the study. Thus, the reliability of the data is low and more subjective. Nevertheless, due to the more qualitative approach of this research this kind of less structured instruments of collections and personal interpretations from the part of the scholar are well-accepted; for the nature of the research itself demands a more abstract and subjective analysis, as Ericsson and Simon (1980) argued.

### **Analysis of data**

The data in research 1 was analyzed in a deductive way, departing from a conceptual framework (TOELF reading comprehension criteria) and aiming at proving the veracity of its initial hypothesis. In order to do that, the researcher used the well-known SPSS software to compare arithmetically the following statistical measures: mean, standard deviation, standard error mean. The results confirmed the difference between the control and uncontrolled group being their mean score 15.18 and 17.78 respectively. Besides that, an Independent Samples T-Test was also used for the analysis of results. According to this test the P value of 'Levene's test for Equality of Variance' is less than  $\alpha$  level (0.05), which reveals that the  $H_0$  that "the variability of the two groups is equal can be rejected" implying that variances are equal. Moreover, the fact that  $P < 0.05 \rightarrow M_1 \neq M_2$  makes the hypothesis to be automatically rejected (See Annex B for the statistical graphics of the study).

In spite of the explicitness of research 1's data and data collection procedures, there are some aspects of the role of certain collected data that are slightly unclear. The impact of the results obtained from the exercises/activities during the training course as well as other possible external factors during those sessions is left aside. Therefore, the drawn conclusion of Think-Aloud method implementation as the main reason for an improvement in reading comprehension is somewhat vague as it is principally the results from the later TOEFL exam the data which is taken into account for the analysis and assumption of a positive effect of the training course in the learners' performance.

By its part, research 2 was analyzed by a deductive procedure as well. There was an already existent ordering system of categories (Descriptions of a "skilled" reader- by Langer (1993), Kucan (1993), Smith (1994)) derived from a conceptual framework and the researcher applied this system to analyze the data. After the researcher transcribed the tape data, she analyzed not only the verbal answers given during the implementation of Think- Aloud but also other para-linguistic and corporal features like the intonation and gestures of the child during the sessions. The researcher provided explanations and suggested hypothesis for relevant or repeated features.

Although the instruments and analysis of data are quite acceptable, the triangulation of the research could have been improved by adding a third part, namely, another researcher or observer (a mature and skillful one), who could "verify and confirm that the scheme had been applied accurately to the data without being influenced by possible biases of his own" (Seliger&Shohamy, 1999, pp.206).

### **Interpretation of the results and conclusions**

The interpretation of results is also a paramount issue in establishing the appropriateness and acceptability of a research. In this section, researches go beyond the evident and draw conclusions, implications and recommendations based on the results of the study (See Seliger&Shohamy, 1999. Unit 10). In the case of research 1, conclusions were basically drawn based on the statistical difference in the scores in reading section of the pre and post TOEFL exams. According to this difference and the results of the *T-test*, there was a significant improvement on students' reading performance after the three-months training course , a course where Think-Aloud method was the cornerstone of the sessions. This derives to the general conclusion that verbal report on reading process as well as strategic training are key factors to rise cognitive awareness and, therefore, be a more autonomous reader, able to apply the right strategies to his own learning process.

There is also a recommendation from the part of the researches. They argued that think-aloud has “the potential of becoming part of the language teacher's repertoire” Jahandar, Khodabandehlou, Seyedi & Abadi, 2012, pp.8) as by this means teachers are able to demonstrate effective comprehension strategies and know in which cases to apply them.

As an implication of the study, some further research on Think-Aloud method is proposed as, even though it is “time-consuming and difficult to analyze”, it depicts one of the most objective methods to observe and analyze mental processes.

On the other hand, researcher in study # 2 is positive about the results of her study. Through this research, she found out that the reason of little interest from the part of her daughter was her lack of identification and involvement with the text and her missing confidence to enable her set a dialogue with the text and negotiate meaning of unknown words. Besides that, the researcher also discovered that Think-Aloud method implementation as well as social reading (sharing with her sister as “reading buddies”) was the reasons behind the change of attitude of the child towards reading and her new passion for books.

A general conclusion drawn from this study is that Think-Aloud “can also be an important tool into developing skilled and confident readers” (Cullum, 1998, pp.12).

From this study, the researcher gives the recommendation to schools of forming what she calls “reading buddies” based on true reciprocity and interaction rather than on reading skills level.

## **CONCLUSIONS**

A review of the researches has shown that Think-Aloud research methods have a sound theoretical basis and provide a valid source of data about participant thinking, especially in highly cognitive processes as reading comprehension, in the mother tongue as well as in a second language. Moreover, due to the versatility of the method, it can be analyzed with both structured and unstructured instruments and be valuable in both quantitative and qualitative approaches; having each of them its advantages and counterparts.

Finally, Think-Aloud has been proved to be one of the most effective ways to not only understand mental processes, but also develop autonomy in learners as they become more conscious of their own thinking processes and, thus, can take a more active part in their identification of own strengths and weaknesses and choice of suitable strategies for improvement.

## REFERENCES

1. Akyel, A. & Kamisli, S. (1996). *Composing in first and second languages: Possible effects of EFL writing instruction*. Paper presented at the Balkan Conference on English Language Teaching of the International Association of Teachers of English as a Foreign Language, Istanbul, Turkey. (ERIC Document Reproduction Service No. ED 401 719)
2. Block, E. (1986). The comprehension strategies of second language readers. *TESOL QUARTERLY*, 20, pp.463-494.
3. Charters, E. (2003). The Use of Think-aloud Methods in Qualitative Research. *Brock Education Vol. 12, No. 2*.
4. Creswell, J. W. (1998) Philosophical and theoretical frameworks. In J. S. Creswell, (Ed.), *Qualitative inquiry and research design: Choosing among five traditions* (pp. 73-91). Thousand Oaks, CA: Sage.
5. Cullum, L. (1998, January). *Encouraging the reluctant reader: Using a think-aloud protocol to discover strategies for reading success*. Report for Department of English, Indiana University of Pennsylvania. (ERIC Document Reproduction Service No. ED 420 837)
6. Davis, J. N., & Bistodeau, L. (1993). How do L1 and L2 reading differ? Evidence from think aloud protocols. *Modern Language Journal*, 77(4), 459-472.
7. Ericsson, K. A., & Simon, H. A. (1980). Verbal reports as data. *Psychological Review*, 87(3), 215-251.
8. Jahandar, S.Khodabandehlou, M. Seyedi, G & Abadi, R (2012). *The Think-aloud Method in EFL Reading Comprehension*. International Journal of Scientific & Engineering Research Volume 3, Issue 9. ISSN 2229-5518
9. Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. In N. K. Denzin & Y. S. Lincoln (Eds.), *the handbook of qualitative research* (2nd ed., pp. 645-672). Thousand Oaks, CA: Sage.
10. Gibson, B. (1997). Taking the test: Using verbal report data in looking at the processing of cloze tasks. *Edinburgh Working Papers in Applied Linguistics*, 8, 54-62. (ERIC Document Reproduction Service No. ED 409 713)
11. Johnson, K. E. (1992). Cognitive strategies and second language writers: A reevaluation of sentence combining. *Journal of Second Language Writing*, 1(1), 61-75.
12. Olson, G. J., Duffy, S.A., & Mack, R. L. (1984). *Thinking-out-loud as a method for studying real time comprehension processes*. In D.E.
13. Pressley, M. & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ: Erlbaum
14. Qi, D. S. (1998). An inquiry into language-switching in second language composing processes. *Canadian Modern Language Review*, 54(3), 413-435.
15. Selifer, H & Shoamy, E. (1999). *Second Language Research Methods*. CIP: Shanghai, China.
16. Someren, Maarten W. Van, Yvonne F. Barnard & Jacobijn A.C. Sandberg. (1994). *The think aloud method: A practical guide to modelling cognitive processes*. London: Academic Press
17. Rankin, J. M. (1988). Designing thinking aloud strategies in ESL reading. *Reading in a Foreign Language*. 4(2), 119-132
18. Sugirin. (1999, February). *Exploring the comprehension strategies of EFL readers: A multi-method study*. Paper presented at an International Workshop on Written Language Processing at the University of New South Wales, Sydney, and Dec. 9, 198. (ERIC Document Reproduction Service No. ED 428 548)
19. Vygotsky, L. S. (1962). *Thought and language*. (E. Hanfmann & G. Vaker Eds., Trans.). Cambridge, MA: MIT Press.
20. Zambrano, K. (2016). *Meaning in the Mind: A contrastive comparison between the role of semantics in the Language of Thought theory and Connectionism*. Unpublished paper. Shanghai University, China.