Comparison of methods for collecting inner speech data

Ryosuke Omi

Abstract

In this paper, I introduce the notion of inner speech and summarize the history of its investigation. I also mention some methods for collecting inner speech data and compare them in terms of visibility, authenticity, objectivity, time and effort, and flexibility. Each method is seen to have both advantages and disadvantages, so researchers should choose a method or methods according to their objectives.

1   Introduction

When you go shopping, you will calculate in silence the total cost of the things that you will buy. In addition, if you meet someone you have met before and you do not remember when you met him/her, you will search your memory in your brain. People, thus, are accustomed to thinking without speaking; that is, people have an ability of inner speech (Vygotsky, 1986).

In the past, the notion of inner speech was mainly applied to the field of basic psychology and developmental psychology. For example, in the late 19th century, Wilhelm Wundt, a German psychologist, recorded the inner perception of his subjects in order to understand human psychology more deeply and vividly (Titchener, 1921). Moreover, Lev Vygotsky (1986), a Soviet psychologist and advocate of inner speech, mentioned this notion in relation to the development of the speech function. Thus, inner speech gradually became a familiar term among psychologists. However, the interest in inner speech is growing more and more among researchers

in the field of second language learning. María de Guerrero (2005) calls inner speech done in a target language (not the mother tongue) *L2 inner speech* (p. 119), and she mentions effective ways to develop L2 learners' L2 inner speech.

Inner speech is considered by some scholars (Gabrys-Barker, 2015; Lantolf, 2003; Sawyer, 2016; Tomlinson, 2003) to have great potential in second language acquisition; however, a big issue still remains in inner speech research. Inner speech is a silent phenomenon, so you are able to perceive only your own inner speech, and you cannot hear another person's inner speech. Because of its inaudibility, it is almost impossible to collect authentic inner speech data. As Vygotsky (1986) mentioned, "The area of inner speech is one of the most difficult to investigate" (p. 226).

In order to solve this problem, inner speech researchers adopted various methods to collect relevant data: in this paper, I would like to introduce these methods based on several studies and critique them from various angles.

2   Concepts of self-directed speech

Before reviewing previous researchers' methods, it is necessary to understand one major notion of *self-directed speech* (Lidstone, Meins, & Fernyhough, 2010, p. 439): inner speech and private speech.

2.1   Concepts of inner speech

Apparently, the difference between inner speech and outer speech is whether it is audible or not. However, inner speech has several unique characteristics that outer speech lacks. Vygotsky (1986) explains one of the unique features of inner speech: *fragmentation and abbreviation* (p. 266). When you tell a situation to another person, you will make a complete utterance; however, in the case of inner speech, you tend to fragment and abbreviate the utterance as needed, and you preserve them in your brain.

Applying a simplifying feature, Vygotsky also mentions, *"Prediction is the natural form of inner speech; psychologically, it consists of predicates only"* (p. 243).

In addition to the grammatical features of inner speech, there is another feature related to its genesis. Inner speech is not an inherent speech system. Children's inward-directed use of language consists of *egocentric speech* (Vygotsky, 1986) instead of inner speech. Egocentric speech refers to a kind of audible speech for children, and Vygotsky (1986) mentions it as follows: *"the child's egocentric speech is a direct expression of the egocentrism of his thought"* (p. 227). Then, when they grow up, their speech system grows up as well. They internalize their egocentric speech in their mind, and they can use a self-directed speech without speaking, that is, their speech system is evolved into inner speech as they mature.

2.2   Concepts of private speech

In this section, I will mention the other self-directed speech: private speech. As de Guerrero (2005) mentioned, private speech is a kind of audible speech which is for the self, and it has similar features as inner speech: *abbreviated and condensed* (p. 24). At a glance, the notion of private speech looks like that of egocentric speech. However, Vygotsky and Piaget did not use the term "private speech" because they mentioned the notion of self-directed speech only in the context of developmental psychology (Vygotsky 1986), and recent researchers (e.g. de Guerrero, 2018: Alderson, Mitrenga, Wilkinson, McCarthy, & Fernyhough, 2018) have mentioned private speech beyond the field of developmental psychology. Therefore, in this paper, egocentric speech is defined as an audible speech for only children who have not internalized that speech into inner speech, and private speech is defined as audible self-directed speech.

3   Several methods of collecting inner speech data

In this paper, I aim to find a method that can solve the great difficulty of observing inner speech. Therefore, I will summarize several methods used by previous researchers and review them from various angles.

3.1   Methods of applying private speech

First of all, I will introduce one of the most major research methods in the field of inner speech. That is, to collecting private speech, or egocentric speech data, instead of inner speech. As mentioned in chapter 2, a difference between private speech and inner speech is whether people can hear the speech or not; namely, private speech looks quite similar to inner speech. Therefore, some researchers have decided to observe private speech instead of inner speech, and Vygotsky (1986) was leading observer of private speech. He focused only on the private speech for children— egocentric speech—but he mentioned the reasoning and advantages of observing egocentric speech based on developmental psychology. After explaining the system of internalizing egocentric speech into inner speech, he said as follows:

> *If this transformation does take place, then egocentric speech provides the key to the study of inner speech. One advantage of approaching inner speech through egocentric speech is its accessibility to experimentation and observation.* (Vygotsky, 1986, p. 226)

In Vygotsky's experiment, he observed children's egocentric speech directly. For example, he (1986) let his subjects perform Sakharov's task (Sakharov, 1930) by recording what they said to themselves.

The most significant advantage of observing private speech is the fact that it is audible. As mentioned in section 2.2, people can hear

somebody's private speech and it has similar function to inner speech. This method is the most famous solution for collecting the invisible data of inner speech. Moreover, this private speech method has simultaneity of thinking and outputting private speech, so it seems that researchers can collect much more authentic data than with any other methods.

3.2   Methods of applying interviews

In research of inner speech, it is not only the way to observe inner speech directly or indirectly. Some researchers use the method of interview style in order to know what people think without speaking. María de Guerrero (1999) prepared a questionnaire with 40 close items and she let her subjects who are advanced L2 learners answer them in 4 stages (from "never" to "always"). Adopting this method, she revealed the system of mental rehearsal, which seems to be a key role of L2 inner speech. In addition to her method, Kuroda is another researcher who adopted an interview for his research on inner speech. He also used a closed questionnaire in order to understand what people think while reading, and analyzed the answers from several angles.

An important advantage of the interview method is the visible features as well as private-speech methods. As de Guerrero (2005) mentioned, *"In an interview, a subject responds orally to a series of questions posed by researcher (p. 99)."* Moreover, the interview method has other unique advantages: the interviewees merely need to answer in multiple-choice questions and they do not have to produce their authentic private speech. It seems to me that this method is easier for both researchers and subjects than that of private-speech method.

In addition to these advantages, this method is more flexible for researchers than the private speech method. In the private speech method, researchers must observe the whole speech whether it is important or not. On the other hand, in the interview method, researchers can focus on collecting data that identifies inner speech. Using this advantage, Kuroda

(2001) analyzed his interview data in two ways: a cluster analysis and a formal concept analysis.

3.3   Diary method

There are also methods in which researchers let their subjects recall what they thought. The best-known retrospective method is the diary method conducted by de Guerrero (2004). She asked her L2 subjects to record their inner speech in their weekly diaries according to her questionnaire. The aim of her method is to collect information on the students' inner speech, and she revealed usage tendency of her L2 inner speech.

In this method, researchers can analyze the visible data of inner speech as well as the other methods. In addition, it is usually necessary to spend plenty of time when researchers conduct task-based experiments relative to inner speech. However, when using daily methods, it is not so time-consuming for participants to write their inner speech in their diary. De Guerrero (2005) also mentioned this advantage as follows:

> *One advantage of the diary, as it was implemented, was that many of the students' entries were written during the last ten minutes of the class or immediately after the L2 inner speech event had taken place and therefore had much more recency of recall than those one could get through a questionnaire.*

3.4   Another method based on a quantitative study

Not all researchers collect the data of utterances which are replacements of inner speech. Lidstone, Meins, and Fernyhough (2010)

did not collect the data of inner speech, and they decided to impose some conditions on their subjects. In order to confirm the role of *self-directed speech* (p. 439) while planning, they had their subjects deal with the London tower task while interrupting their self-directed speech using articulatory suppression, and analyzed the results according to *"the number of excess moves"* and *"whether or not a problem was solved in the minimum number of moves* (p. 443). *"* Then, they confirmed its role for planning with indirect method relative to method.

The main advantage of this method is that researchers are able to analyze the function of inner speech objectively. The results in this method are always stated as a numerical value, when researchers adopt this method and collect numerical data like Lidstone's experiment, they will be able to analyze the data relative to inner speech from the same angles as that of a usual quantitative method.

4   Comparison of methods to analyze inner speech

I compared these methods based on the five criteria: whether researchers can collect the visible and audible sentences which are expressed in inner speech (visibility); whether it is reliable sentences alternative to inner speech (authenticity); whether it is objective method (objectivity): whether it costs a lot in terms of time and preparation (time and effort); and whether they can collect the data effectively (effectivity). I show the results of the comparison in Table 1. A circle signifies a favorable judgment, a cross indicates a negative judgment, and a triangle indicates both positive and negative aspects.

In this table, I plotted three triangles, so I will comment briefly here on the three triangles in the table. Firstly, I will address first the Diary method from the point of view of authenticity. According to de Guerrero's interpretation (2005), private speech has the same functions as inner speech, so the way to collect the data of private speech seems to have high authenticity. Apparently, the diary method also seems to be affirmative in

this area. However, unlike the former approach, the diary method has a time gap between thinking and outputting their thought on the diary, so this method may have an inhibitory effect on complete recording of one's thoughts. Therefore, there is room for doubt regarding the authenticity of the diary method.

Secondly, I would like you to look at the column of objectivity. In Vygotsky's method with private speech, he drew the natural private speech from his subjects. However, if researchers put their subjects under considerable pressure, the drawn data will become unnatural and it cannot be said to be an objective method.

Finally, let us move on to the flexibility of diary methods. The researchers in diary methods usually analyze all the sentences of their subjects' diary, so they can not focus on specific topics and conduct studies effectively and private speech methods. However, as in de Guerrero's approach, if researchers prepare some questionnaires to shape diary entry, they may be able to collect the data effectively, so this method can be said to have moderate flexibility.

	visibili-ty	authentici-ty	objective-ty	time and effort	flexibil-ity
Private speech	○	○	△	X	X
Interview	X	X	X	○	○
Diary	○	△	X	○	△
Indirect analysis	X	X	○	X	○

Table 1   Comparison among 4 methods in Chapter 3

As mentioned, there is no method that has only advantages

to collect inner speech, and there are also no methods that have no advantages. Each method has both advantages and some disadvantages for the analysis of inner speech. Therefore, it is necessary for researchers to make a choice about an appropriate method according to their objectives.

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