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STUDENT LEARNING, CHILDHOOD & VOICES | RESEARCH ARTICLE

The role of private speech in cognitive regulation of learners: The case of English as a foreign language education

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Abstract: Investigations into the use of private speech by adult English foreign language (EFL) learners in regulating their mental activities have been an interesting area of research with a sociocultural framework. Following this line of research, 30 advanced adult EFL learners were selected via the administration of Oxford quick placement test and took a test of solving challenging English riddles while their voices were being recorded. Later, instances of the produced private speech were analyzed in terms of form, content, and function. It was demonstrated that private speech with its different forms, contents, and functions plays a very crucial role in cognitive regulation of EFL learners which has important implications for the context of language learning classrooms. In addition, participants seemed to produce qualitatively different kinds of L2 private speech, which brought us to the conclusion that it would be necessary to consider quality and not just quantity in studying psycholinguistic concepts, such as cognitive regulation and private speech.

Subjects: Education; Language & Linguistics; Language Teaching & Learning

Keywords: cognitive regulation; private speech; foreign language; sociocultural theory

1. Introduction

The introduction of sociocultural theory (SCT) into the field of second language acquisition (SLA) during the 1990s put a broader perspective on the language learning process. In fact, SCT presented an ideology of learning which incorporates both the cognitive and social perspectives. In other words, human learning is believed to be a continuous reciprocal interaction of cognitive, behavioral,

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PUBLIC INTEREST STATEMENT

Learning a language in late adulthood is a gradual and laborious task. The task becomes even more difficult in foreign language contexts where English is not used outside the classroom situations. One interesting issue in the development of a foreign language is whether it can be used as a medium for thinking just like the mother tongue. This is an important question in language education because learners experience long periods of silence thinking about their language proficiency before they are able to express themselves. In addition, sometimes they talk to themselves during this process which is referred to as private speech. Present study attempts to describe the private speech of adult foreign language learners and delineate its functions.

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and environmental factors (Ehrich, 2006). Hence, SCT provides a new ideology on the process of SLA, in which learners are prompted or required to think as well as speak in the target language, that is to say, language and thought should be closely connected with each other. The root for this connection lies in social communicative activities.

Based on the theory, language learning is basically viewed as a social process which is not merely created within an individual. In other words, second language first develops in the social "intermental plane" and successively proceeds into the "intramental plane." In fact, SCT views all mental functioning as a mediated process which develops from external social interaction and goes ahead to internal psychological activity. Higher level cultural tools including activities and artifacts act as mediators in this process. Artifacts, in turn, are either physical (auxiliary means to enhance the ability to control the physical world) or symbolic (auxiliary means to control and reform our biologically endowed psychological processes). Language, as one form of symbolic artifact, is believed to be the primary means of mediation (Lantolf, 2011; Ortega, 2014).

Another important theoretical construct, besides mediation, proposed in SCT research is internalization. This is in fact the process through which cultural artifacts take on a psychological function moving from interpsychological (between people) into the intrapsychological (within the individual) planes through mechanisms such as imitation (Vygotsky, 1978). As Ohta (2001) mentions, collaboration alone is not sufficient for successful language learning to occur. The zone of proximal development (ZPD) includes the need to accomplish something beyond the current level of development as a necessary ingredient. Along with collaboration, a developmentally appropriate challenge is necessary to stimulate development in the ZPD. Language acquisition is viewed as a process of internalizing social interaction and this internalization involves being able to regulate interactions in L2 as well as using L2 as a tool for thinking (p. 11).

In addition, the emphasis on the role of social interaction is not limited to the presence of more than one individual language learner in the learning process. Hence, one important component of the internalization process is when people talk to themselves while they are trying to acquire a language. Self-talk, generated within an individual, can function as a dialog where the learner acts both as the addresser and the addressee. Ohta (2001) defines private speech as "audible speech not adapted to an addressee" (p. 16). She was able to demonstrate that private speech with its three types of language use (repetition, manipulation, and vicarious response) assists L2 development in a Japanese English foreign language (EFL) classroom. Similarly, Smith (2007) focused on the issue of private speech in an ESL classroom and reiterated that private speech provides an opportunity to delve into the mental processing of the learners. The author encourages teachers to attend to every utterance produced by learners even if at first they seem irrelevant to the learning objectives.

Moreover, Swain, Huang, Barkaoui, Brooks, and Lapkin (2009) demonstrated through a pretest–posttest design that the quantity and quality of self-directed speech focused on the concept of voice in L2 French results in the enhanced internalization of the concept. Lee (2008), too, documents the use of private speech by advanced Korean learners of L2 English enrolled in biology classes at a Midwestern University. She recorded each of the participants as they studied alone in preparation for an exam in a private room. Her findings confirmed the use of private speech by the participants (both in L1 and the L2) to help mediate their learning of the target language terminology through establishing meaning, mental rehearsal to retrieve verbal data, monitoring their learning and expressing feelings. In addition, she demonstrates the dialogic nature of private speech to conclude that private speech originates from social speech.

These and many earlier studies (Borer, 2006; Lantolf, 2003) led scholars to conclude that private speech can in fact contribute to the L2 acquisition process, and that without private speech, language acquisition is not likely to occur. However, one primary issue is the nature of the private speech that foreign language learners are involved in. In other words, it is important to examine the content and

form of the produced private speech and then specify their functions. Hence, the present study attempts to delve into the mental processing of foreign language learners. In other words, it investigates the use of private speech by adult EFL learners, if any, in regulating their mental activities.

Diaz (1992) accepts the existence of serious methodological issues in the field of research on private speech. For example, he describes the difficulty of categorizing speech as social or private and the many complex issues that are further raised. However, despite the complexities, he asks "researchers to transform the complex issues into a new set of challenges that will be faced with the creation of new and original methods of investigation" (p. 79). Given the fact that research on private speech in L2 research is yet in its infancy, it will be extremely productive to conduct research in the area.

2. Method

2.1. Participants
For the purpose of the present study a homogeneous sample selection method was adopted. It is a type of purposive sampling that selects a small and homogeneous set of cases for intensive study. This ensures the requirements for internal validity. In other words, the sample is large enough to make sure that most or all of the perceptions that might be important are uncovered and results can be generalized, but at the same time it is not too large for the data to become repetitive and, eventually, superfluous. Hence, 30 adults from the community of students of Farhangian University in Shiraz were selected as advanced language learners via the administration of quick oxford placement test. The selected students were from different majors (Teaching English, Persian literature, Mathematics, Chemistry, Biology, and General education). In addition, they were native speakers of Persian who had learned English solely in the institutional settings of the EFL context of Iran with no experience of living or studying in any English speaking country.

2.2. Materials
The nature of the task that participants dealt with in the present study was solving riddles. These context-based riddles were basically metaphorical statements that called for a holistic understanding of the relations between sentences in order to come up with the correct answer. Reading and repeating as well as manipulating the information and self-explanation were expected to be some of the main activities involved in understanding sentential relationships. All participants were audio recorded while performing the assigned task. They were allowed to consult with their dictionaries in this process. Participants individually sat for the test for 30 min. There was a need for one-by-one data collection and each participant was provided with a highly sensitive MP3 voice recorder to capture low-volume sounds made by them.

2.3. Procedure
Data were gathered one by one with each participant sitting alone in a private room provided with a highly sensitive MP3 voice recorder. Participants were provided with a pen and a piece of paper as well as a bilingual dictionary, and they were instructed to use them when necessary. Participants were asked to answer to the best of their ability 10 cognitively challenging questions. To introduce the task to the participants, the researcher instructed each individual test-taker as follows: "Some people like to talk to themselves while they do this test, if you want to do that that is fine." This was intended not to negatively affect any aspect of data collection. However, in an attempt to avoid the Hawthorne effect as much as possible, the researcher did not explicitly inform the participants about the purpose of the study.

2.4. Data analysis
Following the sociocultural framework, according to Sonmez (2011), the data analysis procedure included transcription, organization, coding, and interpretive analysis. The data analysis procedure in the present study, therefore, followed the same systematic procedure. As the first step, collected data (audio files in MP3 format) were transcribed following the conversation analysis (CA) conventions (see

Appendix A). Utterance was selected as the unit of analysis following the sociocultural theoretical approach towards data analysis (McCafferty, 2002). Utterance is usually defined as a sequence of words within a single person's turn at talk that falls under a single intonation contour. Utterances may be words, phrases, or sentences or any form of speech (Feigenbaum, 1992). The identified instances of private speech were coded in terms of form, content, and function based on the private speech coding manual (Winsler, Fernyhough, McClaren, & Way, 2005) as well as earlier literature on private speech (Ohta, 2001; Sonmez, 2011). This was practiced through a coding scheme developed by the researcher based on the previous literature.

3. Findings and discussion

3.1. The forms of the private speech produced
Table 1 shows the frequency of the produced private speech in terms of form. As it is seen, private speech occurs in all three forms of silent, abbreviated, and asocial loud. However, it is important to notice that sometimes these forms overlap. The abbreviated form, for example, may have been uttered either in a silent tone of voice (silent form) or a loud one (asocial loud). This is probably one of the reasons behind the fact that the use of inferential statistics is discouraged in doing research on private speech.

In terms of form, the asocial loud occurs most frequently in this context followed by the silent forms and with the abbreviated form being the least. The primary function of the asocial loud and silent forms of the produced private speech is to keep the process under control. By externalizing their inner speech, in fact, participants were attempting to focus on the item at hand trying to control their thought processes. For example, when participants read and repeated the items to themselves, they were trying to direct their thoughts towards finding the answer. In addition, the asocial loud private speech seems to motivate the participants forward as they attempted to put themselves together and arrange for their next action. For example, in: "Okay (.) full of holes full of water?", which is externalized after a long period of silent thinking, the exclamation "Okay" indicates that the participant is trying to refocus and arrange for his next move.

However, a lot of factors may have played a role in the occurrence of private speech forms within the data. The types of task that the participants were involved in or their L1 background are certainly key issues that need to be considered while interpreting the results. Overall, as Sonmez (2011) suggests, "the forms of private speech is dependent on the context and therefore factors other than the L1 background of the interlocutors also need to be considered in order to understand the nature of private speech that occurs in the data" (p. 106).

3.2. The contents of the private speech produced
It is important to qualitatively analyze the kinds of the produced private speech to see. Table 2 presents the results of a frequency count conducted on the types of private speech identified in the data.

To make a comparison among the participants with regard to their production of different types of private speech, chi square test (χ^2 test) was run. Table 3 presents the results of the analysis.

Table 1. Forms of the private speech produced			
Form	**Frequency**	**Percentage**	**Cumulative percentage**
Silent	160	42.21	42.21
Abbreviated	16	4.22	46.43
Asocial loud	203	53.56	100
Total	379	100	

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Table 2. Types of the private speech produced

Content	Frequency and percentage
Reading aloud	173 (26.65%)
Literal translation	2 (.3%)
Repetition	55 (8.47%)
Self-directed questions	104 (16.2%)
Self-explanations	174 (26.81%)
Reviewing	91 (14.02%)
Affective markers	19 (2.92%)
Fillers	27 (4.16%)
Metalanguage	4 (.61%)
Total	649

Table 3. χ^2 Tests to compare contents of the private speech produced

	Value	df	Asymp. Sig. (two-sided)
Pearson χ^2	5,432.000[a]	64	.000
Likelihood ratio	2,263.717	64	.000
Linear-by-linear association	490.222	1	.000
Number of valid cases	649		

[a]Fifty-two cells (64.2%) have expected count less than 5. The minimum expected count is .01.

Numerous instances of reading aloud and repetition as well as self-explanations and reviewing show the importance of different types of private speech in cognitive regulation of EFL learners. This confirms the findings of DiCamilla and Anton (2004), who found repetition in L2 peer dialog during a joint writing task functions to establish and maintain intersubjectivity. The mental activity of the learners is mediated by the repetition of both L1and L2 utterances, the effect of which is to create and maintain a shared perspective of the task and to construct scaffolded help that enables them to complete a task. However, what was interesting in this study was the fact that more proficient participants produced qualitatively different kinds of L2 private speech in terms of content. In other words, it was found that quality also needs to be considered in studying psychological constructs, such as cognitive regulation and private speech production.

3.3. The functions of private speech produced

In Table 4, the functions of each type of private speech are mentioned through example of an instance of the private speech produced. In other words, each type of the identified private speech is exemplified and its function is elaborated upon.

As the table manifests, the most common functions of the produced private speech are to manage and direct the ongoing thought processes, to focus attention and avoid distractions, and to orient the participants towards finding the correct answer. In an attempt to comply with the instructions of the task, advanced learners made more use of reading aloud rather than literal translation in order to gain control over the task. In some cases, they repeated the questions several times to come to finer comprehension. The most important function of reading the items aloud is to manage thoughts. In addition, it can help the participants avoid distractions and direct their thoughts towards finding the answer to the item.

In addition, participants mostly engaged in self-explanations, self-directed questions, and reviewing in English. They seemed to have no difficulty conducting their reasoning activity in English. In addition, these participants sometimes go back and forth reviewing the items and consider changes.

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Table 4. The functions and examples of private speech		
Types of private speech	**Example**	**Functions**
Reading aloud	*(Reads the question) what comes once in a minute, twice in a moment but not once in a thousand years? (.)*	• to manage thoughts • to avoid distractions • to direct thoughts
Literal translation	*midoe va rah nemire = hichvaght harf nemizane (.)*	• to come to finer comprehension
	"runs and doesn't walk = never talks (.)"	
Repetition	*It's red, blue, purple, and green (.) red, blue, purple, and: green*	• to focus and direct the thought • to come to finer comprehension
Self-directed questions	*bebin tu xune chi hast intori?*	
		• to self-orient
	"Is there something like this at home?"	• to direct thoughts
Self-explanations	*No, I don't think ....*	• to plan the next action • to manage thought • to self-orient
Reviewing	*May be letters [which item]—once in minute, twice in a moment (.) M*	• to improve performance • to edit
Affective markers	*What the hell!*	• to motivate • to release emotions • to control anxiety • to show discovery
Fillers	*Ok, Ok, so (.)*	• to focus on the current item • to avoid distractions • to save time
Metalanguage	*TART dige yani chi xoda?*	• to search for lexicon
	"For God's sake what does TART mean?"	

Although they might have not been able to find the answer to some items, it seems that they have them in the back of their minds. So, whenever a new idea comes up, they try it on previous items to self-correct. Moreover, participants easily uttered fillers and affective markers in English.

In general, then, results indicate the beneficial functions of private speech, which have also been previously mentioned by scholars. DiCamilla and Antón (2004), for instance, point out the focusing of attention and creation of psychological distance among the primary functions of private speech. In yet another study confirming the beneficial functions of private speech in the language learning process, Swain et al. (2009) focused on two important notions of SCT, namely that speaking regulates cognitive functioning and systematic concepts form the proper unit of instruction. The researchers demonstrate through a pre-test/post-test design that the quantity and quality of self-directed speech (i.e. languaging) focused on the concept of voice in L2 French results in enhanced internalization of the concept. Similarly, Ohta (2001) holds that private speech is a practicable self-regulatory strategy for language learners (especially adult learners of foreign languages) as they intensify efforts at resolving communicative challenges brought about by lack of assess to social communicative environments where they can constructively and naturally practice the foreign language. Khorshidi and Abadikhah (2013), too, demonstrated that private speech functioned to manage their speech, structure th4eir sentences, and get control over the task. All in all, these findings highlighted the importance of private speech as a mediating tool in SLA, which helps learners take control of direction of learning and move beyond their current proficiency levels.

4. Conclusion

The characteristics of language learners' private speech have not been given due attention. This is regardless of the fact that private speech can indeed portray the ongoing cognitive processes of the individuals. Hence, present study investigated the use of private speech by EFL learners in regulating their mental activities. Numerous instances of reading aloud and repetition as well as self-explanations and reviewing show their important role in cognitive regulation of EFL learners. In addition, results indicate the beneficial functions of private speech, such as planning, managing the thought, self-orientation, motivating, and controlling anxiety among many others. Not only does private speech help in focusing attention and controlling the task at hand, but also it helps the participants perform better and it is advantageous to their cognitive development in general. In learning languages, private speech has a lot of applications from repeating linguistic structures and memorizing lexical items to rehearsing language tasks and monitoring their linguistic progress by thinking through or talking about it. It is, therefore, necessary to reconsider the role of concepts such as repetition and reading aloud in language classrooms as these are usually activities which are frowned upon when it comes to learning languages. Therefore, methodologies that strongly prohibit the use of repetition and reading aloud are challenged as they seem to ignore the beneficial functions that can be drawn from such practices. However, there is a need to redefine these concepts to be differentiated from others, such as mimicry, imitation, and rote learning (see Lantolf, 2006 for a discussion on the issue).

In addition, there is a consensus today among stakeholders in teaching theory and practice that most of the learning experiences take place outside the classroom. The implication of this particular consensus is that what the teacher will teach in the class amount to a very small quota compared to the conscious efforts of the learner. The role of the teacher has consequently been reduced to that of an encourager and a facilitator. The teacher encourages the learner to take advantage of learning methods by which learners take full responsibility for their learning. Private speech is one of such learning strategies that put the learning responsibility solely on the language learner, and its use should be encouraged in foreign language learning environments where learners do not have direct access to the use of the foreign language they are learning. Therefore, it can be theoretically argued that when a foreign language learner engages in constant use of private speech, provided those speeches are not corrected as argued by McCafferty (1994), he or she is systematically developing and perfecting proficiency in oral expression.

It is believed that teaching methodologies that are communicative in nature may propel the use of private speech in adult learners (see Lantolf, 1993). Within the context of such language classrooms, students usually get involved with lively interactions with the instructor and their peers. In the interaction hypothesis, Long (1983) proposes that while both input and output are necessary for SLA, in order to gain a greater understanding of how this works, one should focus more attention on the interactions language learners engage in. Long posits that these interactions are not merely a source of second language input, but are rather exchanges that allow the parties to negotiate the meaning of the input. This negotiation results in changes to the complexity of the input.

However and according to the SCT (Lantolf, 2006), interaction need not be solely two-way in nature. In other words, students are sometimes involved in self-talk which helps them infer meaning and comprehend best. Ohta (2001) provides evidence on how her students in a Japanese EFL context use private speech during the task of learning English. In language classrooms, hence, students are expected to get involved in a lot of self-talk in their attempt to come up with an understanding of the language-related issues. Some words and structures are used for self-directed speech (indicated by the low tone), while other counterparts may be used to communicate with the other interlocutor. Thus, the two forms are functionally differentiated. The shift from one to the other is not error correction or self-repair, in that it is not replacing an incorrect with a correct form. It reveals the cognitive shift from self- to other-directed speech, in which the two forms represent two distinct cognitive functions.

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As a result of studies of private speech, a more complex structure of dialogic communication in dyadic conversations emerges. Dialogic communication may not consist of only other-directed utterances between the interlocutors. It also consists of self-directed utterances, even during those moments when the interlocutors seem to be communicating with each other. Thus, in terms of structural patterns of communication in dyadic conversation, the pattern of sequential and social or other-directed speech is oversimplified. For a more complete analysis, the other pattern of self-directed speech or self-dialog needs to be taken into account. Hence, the use of private speech in principle cuts across any native/non-native speaker dichotomy. In this context, errors are not seen in terms of any deviations from native-speaker norm, but different cognitive functions.

Therefore, teachers should make their best to raise their students' awareness of this potential and help them develop their skills as well as they can. Paying more attention to developing these skills in students can help them become more interpretive. By consciously focusing on new language items, students become aware of their nature and only then can they do something about it. Closely monitoring how they are developing their language proficiency will enable them to know about the nature and the quality of their knowledge.

Although there is not yet any accepted procedure to integrate the training of private speech in language classrooms, it may be worth the effort to do so. Acquiring the ability to visualize and use private speech will undoubtedly contribute to students' language development. This will also add up to their confidence for speaking out publically and will hinder anxiety. Teachers are then advised to teach their students how to recall language items and focus on them and use their inner voices to master them. In addition, they should be patient in the face of silent periods produced by language learners as it may be a sign of inner voice development. The presence of various learning styles within language classrooms certainly entails different periods for the emergence of external speech.

In conclusion, we need to mention that researchers studying cognition have realized that people from different cultural backgrounds vary in their cognitive processes (see Nisbett & Masuda, 2003 for a review). In SCT, mental functioning is conceptualized as a mediated process which develops from external social interaction and moves on to internal psychological activity. In this process of mediation, we have access to some higher order tools, such as activities, artifacts, and concepts, which are different among cultures around the world. Therefore, members of different cultures will understandably differ in their cognitive processes since their mental functioning is mediated through access to different tools (see Perkins, 1981 for a discussion on western vs. East Asian societies). Future research will need to address the question of cultural differences in the production of private speech. In addition, we need to keep in mind that the frequency of the occurrence of private speech may be dependent on many other personal factors, such as different personality types, learning styles, and strategies as well as the type of the task we ask the learners to do. Moreover, this study focused only on the oral production of private speech. However, solving the riddles was also concomitant with the written productions of private speech. These included not only language written down while performing the task, but also unclear drawings which can be considered as interesting areas for further research. Finally, another study can make use of a larger sample size to better investigate the performance of male and female students and even students with different majors on how they approach the task of learning new words.

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Appendix A

Transcription conventions

( )	Brackets indicate comments from the transcriber
(.)	A dot enclosed in brackets indicates a pause in the talk
=	"Equals" sign indicates "latching" between utterances
[ ]	Square brackets show an action in the context or translation
(( ))	A description enclosed in a double bracket indicates a non-verbal activity
-	A dash indicates the sharp cut-off of the prior sound or word
:	Colons indicate that the speaker has stretched the preceding sound or letter
.	A full stop indicates a stopping fall in tone. It does not necessarily indicate the end of a sentence
?	A question mark indicates a rising inflection. It does not necessarily indicate a question
Under	Underlined fragments indicate speaker emphasis
CAPITALS	Words in capitals mark a section of speech noticeably louder than that surrounding it
° °	Degree signs are used to indicate that the talk they encompass is spoken noticeably quieter than the surrounding talk

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