The effects of Symmetrical and asymmetrical scaffolding on university students' grammar acquisition

Majid Izanlu[1]*, Mahsa Feyli[2]

[1]MA of Applied linguistics, Kharazmi University of Tehran; [2]MA of Applied linguistics, Azad University of Sepidan

E-mail: majidizanlu@yahoo.com

Abstract

This study investigated the extent to which two approaches to scaffolding, namely the Symmetrical and/or Asymmetrical. Scaffolding could contribute to the acquisition of grammar among Iranian EFL second-year university students. To fulfill this objective, 65 female college students who aged between 19 and 24 were selected through convenience sampling. Two types of instruments, including a grammar test and a set of two way tasks were used for the purpose of this study. After taking a pretest, they were divided into two groups of: Symmetrical scaffolding (SS), Asymmetrical scaffolding (AS). The experimental group AS received instruction according to asymmetric strategy while the experimental group SS was instructed via the symmetric strategy. To answer the research questions, a post-test was conducted and its results were analyzed using independent and paired t-test. The results showed that AS scaffolding is a more fruitful strategy in improving participant's grammar achievement. The results could have some implications for instructors and teachers.

Key words: ZPD, symmetrical scaffolding, asymmetrical scaffolding, grammar

Introduction

From sociocultural point of view, learning and progression are investigated within the social and cultural context. Its founder, Vygotsky, thought that "human learning cannot be understood independently from the social and cultural forces that influence individuals" (Barnard & Campbell, 2005, p. 76). Based on this perspective, people use different instruments to learn and manage their mental activities; and any type of learning happens through dialogues in the Zone of Proximal Development (ZPD) which Vygotsky (1978) suggested as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers." (p. 86).

However, from another perspective which is the Piagetian tradition, cognitive development is dependent on individuals encountering with those who have contradictory thoughts and claims, thereby bringing about conflicts that result in higher levels of reasoning.

Although to both Piaget and Vygotsky, interaction with others can boost the development of mind and cognition, there is a considerable difference between their theories of interaction. In the Piagetian perspective, cognitive development is dependent on individuals interacting with those who hold contradictory thoughts and claims, thereby creating conflicts that ends in higher levels of reasoning (symmetrical scaffolding). In contrast to this view, Vygotsky maintains that learning is boosted when learners interact with more proficient peers (asymmetrical scaffolding). In fact, Piaget

believes in symmetrical relationship among peers, while Vygotsky prefers asymmetrical relationship among learners.

Scaffolding can be employed for improving many learning processes and language skills. The main goal would be the development of language process by using scaffolding. The process starts with the instructor or controlled learning context controlling the learning process. Then it continues to the next stage in which the instructor only helps or offers partial guidance to the learners or by step-by-step encouragement of peer interaction and collaboration. Finally, the learning process is left to the learners where they have to expand the needed skills themselves in the specific area. This is the point where the learners become autonomous and the learning occurs through discovery resulting from the investigation made by learners. In other words, the learners become autonomous, which is the final goal of scaffolding.

The concept of scaffolding, however, is sometimes misinterpreted. As Ellis (2003) truly observed, "Scaffolding is not dependent on the presence of an expert; however, it can also arise in interactions between learners" (p. 193). Because in the present study the asymmetrical group is based on the interaction between more knowledgeable others and less able peers, it is keeping with Vygotsky's original theory dealing with the importance of instruction and the role which is played by more knowledgeable other in the cognitive development. The other type of scaffolding, which is more similar to collaboration, is symmetrical scaffolding. This is more observable when two or more learners who have almost the same level of knowledge in a specific language assist each other to add something to their actual knowledge. Meanwhile, there is no more knowledgeable other in this group. Put another way, all of the students can be considered as more knowledgeable others. So, this kind of scaffolding is in parallel with Piaget's theory which focuses on peer(students who have the same level) interaction and free-exploration (Fotos, 2001; Garton, 1992). Moreover, as Nassaji and Cumming (2000) state _"Numerous authors have recently observed that peer groups of students or work teams, for instance, are also able to construct a ZPD through joint efforts among their members, without expertise residing in any one member of the group" (Nassaji & Cumming, 2000, p. 98)_ comparing these two types of scaffolding in a sense is in fact comparing the theories of Vygotsky and Piaget in cognitive development.

The problem of equal-unequal knowledge or expertise is among the issues for which there is a lot of disagreement between the pioneer cognitive and social constructivists, Piaget and Vygotsky. The research of Piaget and Vygotsky has a huge influence on the methods and approaches of language teaching. Both have suggested their opinions to the field of education through providing explanations for children's cognitive learning styles, intelligence and competence. Even though Piaget and Vygotsky may have opposing opinions about cognitive development in children, both educators provide good ideas on how to teach certain materials in a developmentally appropriate manner. As determined by Piaget (1960), learning is an event that is resulted from mental and physical development and also experience. In other words, development precedes learning. On the other hand, Vygotsky maintains that learning processes result in development.

Review of the related literature

Scaffolding techniques have usually been used widely in a lot of studies and have indicated positive results. The study by Belland, Glazewski and Richardson (2008) is one of many examples of investigating scaffolding where problem-based learning was adopted as an approach with middle school learners in order for them to build their critical reasoning abilities. A small group of students were provided with an authentic, ill-structured problem. They had to comprehend the problem, provide a possible answer, offer evidence to support and present it. Different scaffolding techniques were used to help these learners. The research results indicated that the output intent of scaffolding

is to act as a temporary support before learners have the ability to accomplish scaffolding tasks on their own. At the beginning stages scaffolding was provided by teachers, peers or teaching materials where the students develop from a dependent to an independent stage in gaining the knowledge.

Storch (2002) carried out a longitudinal study to explore the nature of the dyadic interaction among intermediate level ESL students and their learning outcomes. Bye use of Damon and Phelps's (1989) dimensions of equality and mutuality, she discovered four different patterns of interaction out of her data: collaborative, dominant/dominant, dominant/passive, and expert/novice. Among these four types of interaction, for collaborative and expert/novice types of interaction, knowledge transfer was observed in more instances and, in comparison to the other two interaction patterns, fewer instances of missed opportunities for learning were occurring for these two types. Therefore, she indicated that some interaction patterns are more beneficial than others in improving second language proficiency.

Contrary to Storch (2002), Donato's (1994) research develops the scaffolding framework to peer interaction. The study recruited second language (L2) learners of French who were working on a familiar open-ended task. The students were involved in a one-hour planning session as an introduction to an oral activity. The session was recorded and transcribed. Throughout the course of the class session, 32 cases of scaffolded help were recorded. Nine of the 24 co-constructed episodes of linguistic knowledge were later employed in independent performance by the learners when help was no more available. He maintains that learners can scaffold each other, or 'mutually construct' assistance, just in the same way as experts scaffold the performance of novices. He also explains dialogic interaction that has the potential to expand appropriation of linguistic knowledge through individuals who, while working together, form to some extent a collective expert, and who after that have the ability to collaboratively complete tasks that they might not have the ability to perform personally. These claims argue in favor of developing dyad and group work from "simple opportunities to exchange linguistic artifacts to that of the collective acquisition of the second language" (p. 53).

There are also some studies of scaffolding conducted in the context of Iran. Pishghadam and Ghadiri (2011) tried to investigate the impact of symmetrical and Asymmetrical scaffolding on students' reading comprehension achievement of English as a Foreign Language students. Their study was conducted on 52 participants, who were learners in one of the English language institutes in Mashhad, Iran. They consisted of 17 males and 35 females within the age range of 18 to 30 who had several years of experience of studying English at Ferdowsi College. Through   their performance on a pre-test devised by the researchers, they were divided into two homogeneous groups: experimental group A, who covered their English reading passages in homogeneous pairs and the experimental group B, who covered their English reading passages in heterogeneous pairs. Through conducting paired and independent t-tests they analyzed the data. Findings proved the value of interaction and pair work and that both types of scaffolding can be effective; however it also indicated that asymmetrical scaffolding is more effective than symmetrical scaffolding in promoting English reading comprehension achievement.

The findings of Pishghadam and Ghadiri's (2011) study were not completely supported by those of Maftoon and Ghafoori (2009) who investigated the effects of homogeneous (symmetrical) and heterogeneous (asymmetrical) collaborative interaction on the development of EFL learners' writing skills. Their findings showed that although the writing skill of both groups increased significantly as the result of interaction, no significant difference was observed between the two groups.

Baleghizadeh, Timcheh Memar, and Memar (2010) also aimed at clarifying the effect, if any, of symmetrical scaffolding versus asymmetrical scaffolding on English reading comprehension of

Iranian students. The research was carried out on 80 elementary male students in six classes. The six classes were randomly assigned to two inter-class groups, i.e. symmetrical group (SG) and asymmetrical group (AG). Then two parallel tests in the form of a cloze test served as the pre- and post-tests. Since the students accomplished answering the cloze tests with recourse to their similar dictionaries, the results were regarded as the potential knowledge, i.e. ZPD, of the students in reading comprehension. In each of the intra-groups of the SG, consisting of four (at times three) students, the students with similar ZPDs in reading comprehension were asked to work together. While in each of the three classes of the AG, the students with different ZPDs in reading comprehension were grouped together. After the intra-class group assignment, the students worked on ten reading comprehension texts in their groups. At the end of the study two independent and two dependent *t*-tests were run, which indicated that the SG outperformed the AG.

In an EFL context, Lee (2008) studied the way corrective feedback was interacted by expert-to-novice collaborative efforts and scaffolding using 30 participants who were working on three different types of tasks which were jigsaw, spot-the-differences and open-ended question. Because computer mediated interaction can be conducive to affordable learning situations to support both meaning-oriented interaction and focus-on-form reflection that has a central role in the improvement of language proficiency, the results indicated that text chats helped the focus-on-form approach through collaborative interaction. Opposite to the fact that the experts had the ability to provide step-by-step scaffolding at the timely moment to call student' attention to non-target like forms that ended in correcting the errors, they needed to be warned of not over-interruption as learners reported differences between the expert's target and the learner's target in using language.

As the results of the reviewed empirical investigations indicate, although lots of studies have been carried out on the role of ZPD and scaffolding in learning, there is no agreement among the scholars on the influence of some variables such as peers' level of competence and collaboration patterns on the academic achievement of EFL learners. The context of investigations becomes even more complex if the teacher is supposed to be one of the interlocutors in interaction configurations or proximal processes. To the researchers' knowledge, no research study has been conducted on the proximal processes to compare the efficiency of teacher's scaffolding with peers' collaborative dialogue when the learners' level of knowledge is viewed as an influential variable. This research study tries to address this untouched area.

In addition, it looks as if there is lots of contradictions among the results in noticing which type of scaffolding is more beneficial to language learners: Vygotsky and asymmetrical interaction or Piaget and symmetrical interaction (Pishghadam & Ghadiri, 2011). Therefore, the main purpose of this study is to compare the influence of Symmetrical (S) and Asymmetrical (AS) scaffolding on grammar learning of adult learners in an English as a foreign language (EFL) setting in Arak, Iran. The comparison is between the theory of Vygotsky (1978, 1986) and Piaget's (1960, 2000) in cognitive development. Thus, this study is seeking to answer the following questions:

1. Is there any significant difference between symmetrical and asymmetrical scaffolding on grammar learning of Iranian university students?

2. Does symmetrical scaffolding have any significant effect on grammar learning of Iranian university students?

3. Does asymmetrical scaffolding have any significant effect on grammar learning of Iranian university students?

Methodology

Participants

This research project was conducted throughout the fall semester of 2014 involving 65 female EFL students at a university in Arak, Iran. After conducting an Oxford Placement Test, the participants had been recruited out of a population of 200 students. Each semester lasts about three months in the college, and it consists of 13 sessions, once a week and each session is one hour and thirty minutes. The age range of the participants, who also had several years of experience of studying English at language institute, was from 19 to 23. Through their performance in a pre-test on grammar knowledge, devised by the researcher, they were divided into two groups: group one, who covered their English grammar in homogeneous pairs and were labeled as the SS group with 20 students and the experimental group two, who covered their English grammar in heterogeneous pairs and were labeled as the AS group with 22 students. However the study had 4 dropouts, which means that the post-test was carried out with 38 students.

Instruments

In the present study two types of instruments were used:

First, A grammar test was given to the participants to measure their knowledge of grammar. The test was given to participant as both pre- and post-test. This test items covered six areas of grammar, including: a) tenses b) reported speech C) comparison D) subject-verb agreement E) active and passive modals and F) dependent and independent clauses. The test involved 40 items, each item one point, and they were taken from *Understanding and Using English Grammar*, 4th Edition . The format of items was multiple choice and the participants had 60 minutes to take the test. The test was checked for internal consistency and Cronbach's coefficient equaled 0.8. For the purpose of ascertaining validity, the test was checked through panel discussion with TEFL experts. The panel verified the validity of the test.

The second instrument which was used for this study was a set of two-way tasks. Three types of two-way exchange tasks that elicited collaborative interaction were chosen for the current study. Some examples of the topics which were given to the participants are given in Table 1.

Table 1. Topic, task type, and the description of the task

Topic	Task type	Description of the task
Movie Making	Jigsaw	Information gap; convergent; one closed outcome
Persian vs. American culture	Spot-the-differences	Goal-oriented; convergent; one closed outcome
Population growth policy	Open-ended question	Opinion exchange; divergent; multiple outcomes

*Description of each task is based on Pica, Kanagy, and Falodum (1993)

Information gap (jigsaw) and goal-oriented (spot-the-differences) activities are closed tasks with one possible outcome. These two-way exchanges promote negotiation of meaning and *form* (Skehan, 2003). For instance, one of the goal-oriented activities was for the participants to work together to identify 15 differences between two drawings of a messy room. It is likely that specific lexical items or grammar points would be required to achieve mutual comprehension. In contrast, open-ended questions allow free responses that may not necessarily require precise information to

complete the task. Task type influences the amount of corrective feedback received from the interlocutor during interaction. The topics for the tasks were chosen in a way to involve both spoken and written. As an example for the task "population growth policy" the participants were required to write their opinion and then compare and discuss it in orally.

Procedure

The researcher started gathering the data in October 2014 and it took around two month. As stated earlier**,** at the outset of the study, a grammar knowledge pretest was given to ensure groups' knowledge of grammar. Based on the results of the test, participants were assigned to SS and AS pairs. From the experimental groups' participants those whose scores did not differ more than one standard deviation were assigned to SS group while the AS involved those students whose scores on this test differed from others more than one standard deviation. In this way 11 pairs were assigned to SS group and 10 pairs were assigned to AS group. Throughout the process of the research the pairs remained constant. the students in the experiment groups were taught by the same instructor(the researcher) who was an M.A student in applied linguistics and six years of teaching experience**.** A set of two-way tasks, as mentioned in instruments section, was used in this study for a total of 10 sessions. In both groups (S and AS), the participants covered the same tasks for 20 minutes each session. At the first session of treatment, about 20 minutes of the class time was spent on introducing the concept of scaffolding by the teacher. The students were told the purpose of scaffolding: that by discussing the material with each other and helping each other, they would improve their own comprehension. Emphasis was placed on both asking for and giving help, and the need to reach shared knowledge. It was also emphasized that both pairs must participate equally in the activities.

The participants of both groups were required to pay close attention to the target structures (the six areas of grammar which were included in the pretest) depending on the nature of the task. For example in a task about "rural or urban life", which is an open ended task, the participants were enticed and also encouraged to use *comparison.* In that case language related episodes like what follows were observed:

X: I think life in village is so good and productive
Y: However, people in cities more earn than people in villages
X: You mean "villagers earn more than city people"?. Verb, before "more than". ok?
Y: Yeah, right.

These tasks were taught cooperatively to the subjects in both S and AS pairs. This cooperation formed the treatment of the study. The pairs discussed their understanding of the tasks. They were also required to focus on form. At the end of the study, the S and AS groups took the post-test in order to compare the subjects' performance on this test after treatment.

Data Analysis

The raw data which was collected from participants' performance on pretest and post test were entered into the SPSS. To start analyzing the test results, the researcher conducted an Smirnov Kolmogrove to check the homogeneity of the participants of both groups. Since the results were satisfactory, the researcher started to compare means of both group test results, using t-test. To check the usefulness of SS group a paired t-test comparing their pretest and posttest was used. The same comparison was made between pretest and posttest of AS group to check asymmetrical scaffolding's usefulness. Finally, to find which type of scaffolding is more fruitful, an independent samples t-test was used to compare the post test results of SS and AS group.

Results

Regarding the first research question which was concerned with the difference between symmetrical and asymmetrical scaffolding on grammar learning of Iranian university students the descriptive statistics are presented in Table 2.

Table 2. Descriptive statistics for posttest scores of the SS and AS groups

	N	Mean	Std. Deviation	Std. Error Mean
Symmetrical	20	26.0500	4.95745	1.10852
Asymmetrical	18	27.6667	6.59768	1.55509

As it has been shown by descriptive statistics AS group scored better than SS group. The mean score of AS group in posttest was 27.66 while mean score of SS group equaled 26.05. However this difference needed to be checked for statistical significance. An independent samples t-test was used to show if this difference is statistically significant or not. The t-test results are indicated in Table 3.

Table 3. Independent samples T-test for significance of posttest scoring difference

AS & SS	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
post-test	5.489	.025	-.859	36	.0396	-1.61667	1.88120

** significant at 0.05

As the t-test results indicate, the difference of achieved scores on the posttest has not been by chance. In other word, since sig. (2-tailed) at $p < 0.05$ is less than 0.05 (equaled 0.039) , the score difference between the two groups has not been by chance.

Regarding the second research question, which was concerned with the effects of symmetrical scaffolding on grammar learning of Iranian university students, the students' mean score in SS group was raised from 25.4 in pretest to 26 in the post test. Descriptive statistics of pre- and post-test results of symmetrical group are given in table 4.

Table 4. Descriptive statistics of pre- and post-test results of symmetrical group

Symmetrical	N	Mean	Std. Deviation	Std. Error Mean
Pretest	20	25.4500	2.13923	.47835
Posttest	20	26.0500	4.95745	1.10852

As the mean scores indicate, the SS group participants have gained higher scores after receiving the treatment. However, it needed to be checked for statistical significance to see if the raise of scores has been accidentally or as a result of treatment. To check the significance of the difference between pretest and post test, a paired samples t-test was conducted. The t-test results are indicated in table 5.

Table 5. Paired samples t-test for SS group before and after treatment

Symmetrical	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-post	-.60000	4.01838	.89854	-.668	19	.512

As the t-test results indicate, the change of scores after treatment has been by chance. In other word, since sig. (2-tailed) at p<0.05 is higher than 0.05 (equaled 0.51) , the score difference between the two groups has been by chance.

Third research question was concerned with effectiveness of AS on grammar learning of Iranian female university students. The students' mean score in AS group rised from 26.7in pretest to 27.6 in the post test. Descriptive statistics of pre- and post-test results of symmetrical group are given in table 6.

Table 6. Descriptive statistics of pre- and post-test results of asymmetrical group

Asymmetrical	N	Mean	Std. Deviation	Std. Error Mean
Pretest	18	26.7222	7.33088	1.72791
Posttest	18	27.6667	6.59768	1.55509

As the mean scores indicate, the AS group participants have gained higher scores after receiving the treatment. However, it needed to be checked for statistical significance to see if the rise of scores has been accidentally or as a result of treatment. To check the significance of the difference between pretest and post test, a paired samples t-test was conducted. The t-test results are indicated in table 7.

Table 7. Paired samples t-test for AS group before and after treatment

Symmetrical	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-post	-.94444	1.76476	.41596	-2.271	17	.036

As the t-test results indicate, the scores have been changed after treatment. In other word, since sig. (2-tailed) at p<0.05 is less than 0.05 (equaled 0.51) , the score difference between the two groups might be due to treatment.

Discussion

This study was an investigation to check which degree of proficiency distance between the possible interlocutors in educational settings resulted in better improvement in Iranian female EFL learners in some aspects of grammar. The obtained results indicated that there was significant difference between SS group participants and AS group participants. When comparison of scores of before and after treatment was done on SS group, the results revealed that they did not progress significantly. However, when comparison of scores of before and after treatment was done on AS group, the results revealed that they progressed significantly. The other finding of the study was that AS is a more fruitful strategy than SS in improving participant's grammar achievement.

According to the results demonstrated through examination of the data in the preceding sections, it was found that the participants in the AS group achieved more. This may imply that AS instruction is vital to improving EFL learners' knowledge of a) tenses b) reported speech C) comparison D) subject-verb agreement E) active and passive modals and F) dependent and independent clauses. The results were more compatible with Vygotsky's theories than with those of

Piaget's on learning. They are compatible with Vygotsky's claims (1978) that learning appears first on the social plane, in collaboration with more knowledgeable individuals

Findings of this study are in some aspects consistent with Pishghadam and Ghadiri (2011). Although their focus of investigation was reading comprehension, they found that both symmetrical and asymmetrical scaffolding can be effective. However, what is more consistent with this study's results is that based on their study asymmetrical scaffolding is more effective than symmetrical scaffolding in promoting English reading comprehension achievement.

Findings do not confirm Maftoon and Ghafoori (2009). While present study showed that SS was not significantly helpful, their study revealed that both types of scaffolding (SS and AS) increased writing ability significantly. The other discrepancy between the two studies is that while present study indicated that AS group participants achieved significantly higher scores than SS group participants, Maftoon and Ghafoori (2009) found that there is not statistically significant difference between the two groups. However, it must be borne in mind that they investigated participants writing ability and not grammar.

In the case of heterogeneous dyadic collaboration, the findings of this study are in partial agreement with those of Storch (2002) and Kim and McDonough (2008), which have indicated that better results can be obtained if unequal partners instead of equal partners are paired up. In this study no significant difference was found between the symmetrical group which indicates that an equal level of success cannot be achieved in homogenous pairs. But statistically better performance in AS group in comparison to the SS group indicates the superiority of the heterogeneous pairing to the homogenous pairing and provides additional support for the findings of the previously-mentioned studies.

Conclusion

As the analysis of the data revealed, the AS instruction group benefited significantly more in knowledge of grammar than the SS instruction group. It can be concluded that SS instruction is less efficient than the AS instruction. That is, after treatment, using SS approach has less positive effect on students' grammar knowledge score. The positive effect of AS instruction is revealed after receiving treatment. When compared to the SS group scores that were instructed through the SS instruction the mean scores of AS group has a significant and meaningful increase. As Pishghadam and Ghadiri (2011) convincingly state, When pairs are AS, learners are able to function in a role more typically restricted to the teacher, providing scaffolding to assist the other. It provides comprehensible input and output, that is to say when students cooperate with each other, they modify and adjust the sentences in a way that other students have almost no difficulty in understanding.

The findings of this study have implications for teachers. Pair work is a central task in any language class and teachers usually do not know how to arrange the pairs. Some teachers arrange them by age, while other teachers arrange pairs by proficiency level. The results of this research indicated that when arranging pairs, teachers need to choose students from differing proficiency levels. This study also indicated that the needed knowledge or expertise for scaffolding does not necessarily reside within instructor but can be constructed collaboratively by peers. To get such quality collaboration, at least one of the peers must exceed a knowledge threshold to provide a sound base from which collective scaffolding can be built.

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