



The Efficacy of the Deductive and Inductive Approaches in Teaching Information Structure (IS) of Non-Canonical Sentences and Its Effect on Iranian EFL Learners

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ABSTRACT

The present study attempted to compare the efficacy of the Deductive and Inductive approaches in teaching Information Structure (IS) of non-canonical sentences and its effect on Iranian EFL learners' reading comprehension in college. In this respect, through a quasi-experimental design, 69 undergraduate Persian-speaking EFL learners (28 males and 41 females, mean age ≈ 21 , age range=19-24, years of EFL learning ≈ 8 , sophomore); majoring in English Literature and English Translation at the department of English Language and Literature, Arak University, Iran, were chosen in the form of two homogeneous intact groups, namely Deductive (experimental) and Inductive (control) groups which consisted of 36 and 33 participants respectively. A six-week training course including twelve treatment sessions of the Deductive vs. Inductive instructions of IS principles was provided. The results of statistical comparisons using paired-samples t-test and independent-samples t-test concerning the participants' performance of each group indicated a significant improvement in reading comprehension. Concerning the pretest to the post-test phase, the momentum of progress has been sharper in the Deductive group. Regarding the post-test to the delayed post-test stage, deterioration of obtained reading comprehension abilities by EFL learners in the Deductive group has been statistically significant, whereas the findings indicated that the EFL learners of the Inductive group have shown statistically considerable retention of improved skill.

KEYWORDS: Deductive Approach; Inductive Approach; Information Structure (IS); Non-canonical Sentence; Reading Comprehension



INTRODUCTION

It seems uncontroversial to claim that in today's world, reading comprehension ability plays a more dramatic role in humans' personal, academic, and working life. By looking at modern societies, there remains no doubt that people are surrounded by a massive amount of print sources, including books, magazines, newspapers, non/scientific articles, and internet sources like cell phones, laptops, tablets, etc.; it means that people in different settings have to read different types of texts for a wide range of purposes. People read texts for a variety of reasons such as reading for general comprehension and gaining information, reading for entertainment, and reading for synthesizing and evaluative purposes (Grabe, 2008). So it may cannily be asserted that if reading comprehension skill is not more important than other language skills, it would not be of less importance. Research in this area shows that a high reading comprehension ability can lead to improvement in other language skills (Graham et al., 2018; Hamrayevna & Rashidovna, 2019). In this regard, Grabe and Stoller (2013) specify that living in the new century for educated citizens will require more vital literacy skills in reading and writing in a wide range of social contexts.

When it comes to English as Second Language or English as Foreign Language contexts, especially when learning a new language requires following academic or career goals, this becomes especially important. Reading is a critical activity in language classes. Reading is a complementary skill, and second language learners must read authentic materials to boost their communication abilities. However, there is compelling evidence that lower English proficiency is a consequence of lower reading comprehension and overall academic achievement is also strongly related to reading comprehension. Indeed, the adolescent readers' lack of understanding of lexical, grammatical, and expressive features relevant to academic language will become an obstacle to inquiry (Townsend, Barber, Carter, & Salas, 2020; Verhoeven, Voeten & Vermeer, 2019).

One of the problematic areas concerning the early and advanced phases of second/foreign language acquisition is the role of discourse organization in the realm of SLA/FLA, which has increasingly attracted the attention of researchers (Carroll, Murcia-Serra, Watorek, & Bendiscioli, 2000). The evidence reveals that information structure (IS) as a subfield of discourse organization is considered an essential element for the dynamics of untutored language acquisition. As Chafe (1976) maintains, information structure refers to how interlocutors organize or package the informational content of their message to meet the communicative needs of other interlocutors. Thus, the lack of familiarity with the information structure of the target language can cause serious impediments to the communicative function of language regarding the realm of SLA/FLA.

Based on the above documentations, nearly all these problems have their roots in students' unfamiliarity with discourse structures and information distribution in the sentences of a text. Moreover, Kaiser and Trueswella (2004) demonstrated that, unlike canonical structures, the syntactic forms of non-canonical sentences are more complicated to process, and as a result, understanding them requires more cognitive computation. To tackle these problems, the researchers of the present study decided to provide their EFL learners with adequate and effective instructions designed to cover the information structure (IS) of non-canonical sentences of the English language. The researchers



sought to determine whether the EFL learners' knowledge about the information structure (IS) of non-canonical sentences can lead to the enhancement of their reading comprehension ability or not. Deductive-Inductive approach to teaching was used in this regard.

LITERATURE REVIEW

READING COMPREHENSION

Humans are not typically readers from a biological standpoint. (Andrews, 2015; Seidenberg, 2017). Regarding early childhood, when humans have access to typical environmental conditions relevant to cognitive development, people can learn to speak and hear naturally exposed languages, regardless of race or geography. Contrary to speaking and listening, the human brain is not genetically hard-wired to read and comprehend in a natural path; that is to say, reading skills should be taught by someone else (Grabe & Stoller, 2019).

In the age of information explosion, poor literacy skills will be comparable to physical disabilities and limited reading ability has much the same effect as limited physical ability. In this way, we should do our best not only to become proficient readers but also to change into a strategic reader. In the eyes of strategic readers, reading encompasses a purpose, and different goals require different reading types (Knapp & Schwanenflugel, 2016). When someone begins to read, the following questions may come to his/her mind: Why am I reading, and what purpose/s is behind the curtain of this action (Britt, Rouet, & Durik, 2017; Broek & Helder, 2017). Comprehension is the core component of skilled reading i.e., how well someone understands a piece of text and if readers do not comprehend, they are not reading indeed (Grabe & Stoller, 2019). In this regard, the primary object of this association is to understand the message embedded in the heart of a text for which each word in a sentence must be identified by the reader/s and then the syntax of the language should be used to put these words into a coherent and unified construction (Cutter, Paterson, & Filik, 2022). A proficient reader enjoys the ability of understanding and remembering the words while s/he is reading a text to extract the basic grammatical information (syntactic parsing) and to maintain clause-level meaning. "The ability to recognize phrasal groupings, word ordering information, and subordinate and superordinate relations among clauses quickly allow fluent readers to clarify how words are supposed to be understood" (Grabe & Stoller, 2019, p. 16). Concerning the L1 context, researchers found a strong correlation between syntactic processing and reading comprehension (Klauda & Guthrie, 2008). Based on observational evidence in 12 contexts, grammar and reading are highly related (Urquhart & Weir, 2014).



INFORMATION STRUCTURE IN L2 READING

The term Information Structure (IS) was first introduced to the realm of linguistics by Halliday (1967). Thenceforth, studies related to this field turned into an essential part of the linguistic pragmatic mainstream (Féry & Ishihara, 2016). Humans are inherently social beings, which means that they cannot live in isolation, and naturally, they do not do so. Human beings live and meet their needs through social cooperation and association and for this, they have to communicate with each other. Languages used by humans are organized in ways that comprise words and structures by which sentences are made up. This organization is called information structure (Halliday, 1967; Lambrecht, 1996). Natural languages provide their speakers with various alternatives for conveying the same essential informational content, and information structure explain why speakers of a given language prefer some linguistic forms over other structures. The term 'packaging' expresses the application of syntactic structuring to serve pragmatic functions (Birner & Ward, 1998). For example, in English, the following sentences can all be used to convey the information that Dr. Maryam Mirzakhani, the first woman and the first Iranian mathematician, won the Fields Medal On 13 August 2014;

Professor Maryam Mirzakhani won the Fields Medal. (Canonical sentence)

The Fields Medal, Professor Maryam Mirzakhani won. (Left-dislocation)

The Fields Medal was won by Professor Maryam Mirzakhani. (Passive)

It was professor Maryam Mirzakhani who won the Fields Medal. (Cleft)

What professor Maryam Mirzakhani won was the Fields Medal. (WH-cleft)

She won the Fields Medal, professor Maryam Mirzakhani. (Right-dislocation)

Now the question is why people express things differently. Information structure may provide this question with an appropriate explanation that variation in linguistic forms occurs as a result of informational considerations on the side of interlocutors who take part in an information-sharing activity. In this vein, what is assumed about the mental state of the addressee, what s/he is supposed to know already and what s/he is accepted to attend to as focal information are the defining elements which structure how people say what they say. When people communicate with each other, in addition to constructing the linguistic units, they put the relevant information in its proper place. This appropriate placement is of high significance since it paves the way for successful a message delivery and makes it possible for the hearer or interlocutor to understand the prominent information. Accordingly, information structure, besides syntactic studies, encompasses pragmatic analyses (Oktavianti, 2016).



In association with structural aspects of constructing meaning from a text, structural knowledge is a critical factor in the efficient processing of any text. Readers unacquainted with the structure of a text regularly have no way of organizing the information extracted from that text and consequently will gain information haphazardly. In contrast, others who are familiar with text structure can manage informational content of the text better as they read (McCardle, Chhabra, & Kapinus, 2009). Vahidi (2008) demonstrated that learners equipped with text structure knowledge exceed others in automaticity for the logical processing of discourse patterns. Chalak and Nasr Esfahani (2012), in a quest to study the effect of awareness of text structure on reading comprehension of Iranian EFL learners, showed that students' familiarity with text structure as a cognitive strategy leads to improvement in their reading comprehension abilities.

Finally, as Grabe and Stoller (2019) put it, the absence of tacit L2 grammatical knowledge besides discourse knowledge in the L2 context suggests that for more productive reading comprehension, perfect mastery of structural knowledge and text organization are desirable for L2 learners. For L2 readers who aim to develop academic skills, knowledge of discourse organization, in particular, can be of high importance, and teaching discourse organization patterns demand special attention.

In this study, we tried to teach information structure of non-canonical sentences within the context of the Deductive vs. Inductive approach to find whether instructing structural knowledge of non-canonical sentences can affect EFL learners' reading comprehension ability and, if so, which method may lead to maximized improvement and retention.

THE DEDUCTIVE VS. INDUCTIVE L2 TEACHING

From a historical perspective, Claudius Holyband, in the 1500s, most likely was the first renowned English teacher who incorporated what appeared to be known as an Inductive approach into second language teaching (Howatt, 1984). Induction is a sort of logical reasoning through which someone moves from the particular to the general (Fleming, 2018) meanwhile, when it comes to second language education (SLE), Inductive teaching is an approach that requires learners to extract rules from the provided examples (Ellis, 2015). In this respect, concerning Inductive grammar teaching, the teacher provides examples that meet specific grammar structure/s for learners. Based on the provided criteria, students, via self-discovery, figure out the underlying grammar rule/s (Larsen-Freeman & Anderson, 2013). So, by Inductive teaching, the students are encouraged to notice how grammatical rules work through the provided examples with specific grammatical structures, and learners are not taught formats directly. In recent decades, Inductive practices in foreign/second language education have been reflected decidedly in audio-lingual and communicative approaches. Like the direct method, oral communication has been emphasized by the audio-lingual practice, and explicit instruction of grammar instruction has not been stressed. Anyway, Inductive approaches are not necessarily implicit since, during an implicit learning session, students are unaware of what is being learned and what is being taught simultaneously (Richards & Schmidt, 2002).



On the contrary, deduction is a type of logical reasoning that starts from the general to reach the particular. Deductive teaching within the framework of second language education (SLE) happens when learners proceed from rule provision towards rule application i.e., the rule provision is the starting point (Glaser, 2014). It is of note to remember that Deductive approaches mainly manifested through explicit instruction, technically invoke teachers or instructors to directly provide the linguistic content for the learners (Richards & Schmidt, 2002). The Deductive teaching is a hallmark of the grammar-translation method. EFL/ESL teachers should remember that Inductive teaching, compared to The Deductive one, usually takes more instruction and time. Fleming (2018) asserts that teachers prefer to use The Deductive approaches to instruction especially when time is short. They have to instruct a large amount of educational content. On the contrary, when it comes to the long run, Inductive approaches show more effectiveness because of focusing on learning by doing.

As stated by Vogel, Herron, Cole, and York (2011), theoreticians in the realm of second language acquisition take language learners as the ones who actively participate in class activities and construct their learning styles rather than passively receiving the instructions in the form of external stimuli. Compared to the Deductive approach, the Inductive approach of teaching is a much more student-centered approach by which intuitive heuristics activate (i.e., capacity for independent discovery), language awareness fosters, negotiated interaction facilitates, and learner autonomy promotes. In this way, language learners make hypotheses and test them continuously to find language rules. Although there exists a strong consensus on the notion that Inductive approaches to teaching meet more activeness in comparison with The Deductive ones (Vogel et al. 2011), this does not mean that the Deductive methods of teaching are passive.

Based on the related literature review and to the best knowledge of the researchers, no similar research has yet been found which examined the effect of instructing non-canonical structures on Iranian EFL learners' reading comprehension. In this regard, the following study is trying to find appropriate answers to the following questions:

1. Does Deductive teaching of information structure of non-canonical sentences have any significant effect on Iranian EFL learners' reading comprehension?
2. Does Inductive teaching of information structure of non-canonical sentences have any significant effect on Iranian EFL learners' reading comprehension?
3. Is there any significant difference between using the Deductive vs. Inductive teaching of information structure of non-canonical sentences in EFL classes?

METHODOLOGY

Students from the departments of English Literature and Translation at Arak University, Iran, participated in this study. Possible effect/s of Inductive and the Deductive teaching of information structure concerning non-canonical sentences on Iranian EFL learners' reading comprehension ability, were investigated. Persian teachers taught the



provided materials, and each class time was designed for 10 minutes. To do this research, a quasi-experimental design was adopted, which includes a pre-test, a post-test, a delayed post-test, one the Deductive (experimental), and one Inductive (control) group. It was conducted in the English language department at Arak University, Iran.

For the present study, 69 EFL learners majoring in both English translation and English literature courses, took part in the study. To produce a homogeneous population of participants, researchers at the outset administered the Oxford Placement Test (OPT). Referring to the results, nobody was removed from the process of data collection since no extreme points and outlier cases were found. The researchers put EFL learners into two homogeneous intact groups. Hereafter, for ease of reference to the groups of subjects in this study, we refer to them as the Deductive group and the Inductive group. 33 participants, including 20 females and 13 males, and 36 participants, including 21 females and 15 males made up the Deductive and Inductive groups respectively. As linguistic knowledge increases with aging (Hartshorne & Germine, 2015), consistent with the participants of the study, the variable of age has not been considered as an influential factor and has been excluded.

INSTRUMENTATION

OXFORD PLACEMENT TEST (OPT) AND THE TEST OF READING COMPREHENSION

The Oxford Placement Test (OPT) was taken to measure the degree of homogeneity of the participants. In the next phase, the reading comprehension section of TOEFL (1996) was employed as a pre-test, and post-test, and also delayed post-test to determine the participants' reading comprehension improvement. The validity of this section was already proven, and the reliability was reported to be .88 via the Cronbach alpha formula (Ahmadian & Pashangzadeh, 2013).

To determine the reading ability of participants, six texts, including three narratives and three non-narratives with specific characteristics, which were used by Ahmadian and Pashangzadeh (2013), were presented. The first characteristic was the number of words in each text from 1350 to 1650. So, the texts were not too long and the reading process did not turn into a tedious task. On the other hand, the texts were not too short; thus, their importance and value for participants were not lost. In this study, we intentionally used a mixture of narratives and non-narratives as tasks of elicitation since, in a series of studies, it was found that the type of texts to be read has implicitly constructive effects on L2 learners' reading comprehension abilities (Ahmadian & Pashangzadeh, 2013, 2014; Pashangzadeh, Ahmadian, & Yazdani, 2016). Consequently, by combining twin narratives and expository texts for both groups of participants, the mentioned implicit effect of text variation was controlled.

Since the participants had an average of nearly 8-years of experience in EFL learning, the researchers were supposed to provide them with texts which were just far enough beyond their current linguistic competence so that they could understand most of them. However, the texts must remain difficult enough for learners to make progress (comprehensible input (Krashen, 1981, 1982). To do so, the texts Flesh Ease had to fall between 65 and 75 readability score. Based on Online-Utility.org analysis, to quickly understand the text on the first readability as mentioned earlier,



a person needs to have nearly 8 to 9 years of formal education in EFL learning, a prerequisite which was met by all. The specifications of the selected texts are provided in the following table:

Table 1

Specification of Reading Texts (Information Extracted from Pashangzadeh (2012, p.52)

Title of the Text	Type of the Text	Author	Flesch Reading Ease	Number of words
It happened on the Brooklyn Subway	Narrative	Paul Deutschman	70.51	1,605
Mystery Surrounding the Phoenix Lights: Evidence of UFO Sighting?	Non-Narrative	Unknown	66.83	1,563
The Hungry Man was Fed	Narrative	Richard Harding Davis	72.45	1,386
My Mother Never Worked	Non-Narrative	Bonnie Smith-Yackel	72.85	1,373
Personal Narrative-Track Competition	Narrative	Unknown	73.90	1,613
The Nature of the Mankind	Non-Narrative	Unknown	67.23	1,622

DESIGN

Random assignment of participants is desirable if it is supposed to guarantee an equal and independent opportunity for the selection of each participant in the study (Mackey & Gass, 2015). But in many circumstances, implementation of randomization seems difficult, if not impossible. Concerning this study, it was unreasonable to expect that we could ask the director of the department to randomly assign the participants to two groups to benefit our research. So a quasi-experimental method was employed for the design of this study.



PROCEDURE

The selection of participants based on OPT results was followed by the determination of one group as the entire experimental group (The Deductive group) and another as the control group (Inductive group). Then, for the pretest, the Reading Section of Paper-Based TOEFL (1996) was administered. This pretest was also considered as a screening test based on which homogeneous students concerning reading proficiency were allowed to participate in the continuation of this study; nobody was removed from the process of data collection since, regarding the results, no extreme points and outlier cases were found (see section 4.1). After pretest administration, for both groups, twelve treatment sessions were held according to the following roadmap. As shown in Table 2, the interval comprised six weeks (I, II, ..., VI), and each week consisted of two treatment sessions (1, 2); each session was divided to two halves of fifty minutes (A, B).

As mentioned in previous sections, six texts, including three narratives and three non-narratives, were dealt with as tasks of elicitation in six two-session weeks. For example, the first half (A) of the first session (1) of the first week (I) was devoted to presenting and teaching items such as Old (=given, familiar) information vs. New (=unfamiliar) information/ Discourse familiarity: Discourse-old vs. Discourse-new information/ Hearer familiarity: Hearer-old information. Then, in the second half of the first session (1, B), participants were asked to read the first part of the narrative text titled 'It happened on the Brooklyn Subway.' Reading each paragraph, participants needed to find and discuss with each other the relevant examples of what had been learned based on provided instruction in the previous section (1, A). The first half of the second session (2, A) was devoted to reviewing the content presented in the previous session. Several students explained what they had learned in the previous session willingly. And finally, in the second half of the second session (2, B), reading the rest of the text, the remainder from the previous session, was continued with students based on what has been done in (1, B). No need to mention that the Inductive method of teaching was used in the Inductive group of participants, and the Deductive instructions were used in association with the Deductive group of participants. Irrespective of the Deductive or Inductive teaching approach, common reading strategies have been used in both groups, and the instructor asked the EFL students to preview the text, try to link it to background knowledge, connect different parts, pay attention to its structure and use discourse markers to detect structural relationships.

Table 2

Twelve Treatment Sessions Roadmap

Training week	Treatment Session	Part (each part)	Provided instruction by Instructor in each Treatment Session (all treatment sessions consist of two 50-minute sections.) the Inductive teaching method was used in the Inductive group of participants, and the Deductive instructions were used in the Deductive group of participants.
I	1	A	Old (=given, familiar) information vs. New (=unfamiliar) information/ Discourse familiarity: Discourse-old vs. Discourse-new information/ Hearer familiarity vs. Hearer-old information
		B	Reading the first part of the narrative text titled 'It happened on the Brooklyn Subway.' Reading each paragraph, participants were supposed to find and discuss with each other the relevant examples of what has been learned based on provided instruction in the previous section (1(a)) (this procedure is repeated in 3(B), 5(B), 7(B), 9(B), 11(B) concerning recently provided texts and newly taught material).
	2	A	A review of the content presented in the previous session. Several students explained what they had learned in the last session (this procedure is repeated in 4(A), 6(A), 8(A), 10(A), 12(A).
		B	Reading the rest of the text, the remainder from the previous session, was continued students based on what had been done in 1(B).
II	3	A	Topic vs. comment/ Focus vs. background (presupposition)/ Are the dichotomies old-new, focus-background, topic-comment the same?
		B	Students started to read the non-narrative text titled 'Mystery Surrounding the Phoenix Lights: Evidence of UFO Sighting?' through reading the text they found examples of what have been learnt based on provided instruction in section 1(a) and 3(A); with the focus on provided instruction in 3(A).
	4	A	A brief review on the presented materials through previous sessions by volunteer students.
		B	Reading the rest of the text, the remainder from the previous session
III	5	A	Theme vs. Rheme/ Generalizations about IS and word order
		B	Reading the narrative text, titled 'The Hungry Man was Fed.' Next, finding true examples of presented instruction in 5(A).
	6	A	A brief review on the offered instructions through previous sessions by volunteer students.
		B	I am reading the rest of the text, the remainder from 5(B).
IV	7	A	How information structure affects the use of particular constructions/ Passive/ Constructions with subjects after the verb/ THERE-INSERTION/
		B	Students read the non-narrative text titled 'My Mother Never Worked.' Next, they found actual examples of presented instruction in 5(A) while reading each paragraph.



	8	A	A brief review of the presented materials through previous sessions was submitted by students voluntarily.
		B	The rest of the text, the remainder from 7(B), was read accompanied by activities explained before.
V	9	A	LOCATIVE INVERSION/NP preposing/ Left dislocation/ Right dislocation
		B	The narrative text titled ‘Personal Narrative-Track Competition’ was read by students. Actual examples were found concerning the given instructions in section 9(A).
	10	A	A brief review on the offered instructions through previous sessions by volunteer students.
		B	Reading the rest of the text, remainder from 9(B) accompanied by before mentioned activities.
VI	11	A	Topicalisation/ It-clefts/ Wh-clefts (=pseudoclefts)
		B	Participants read the non-narrative text titled ‘The Nature of the Mankind.’ Then, reading each paragraph of the text, they tried to find true examples of presented instruction in 11(A).
	12	A	A brief review of the offered materials through previous sessions was presented by participants voluntarily.
		B	Students read the rest of the text, the remainder from 11(B) is accompanied by the previously mentioned designated activities.

RESULTS

PAIRED-SAMPLES T-TEST (THE DEDUCTIVE GROUP PRETEST-POSTTEST-DELAYED POSTTEST)

A paired-samples t-test was performed to keep track of the possible changes in the EFL learners’ reading mean scores concerning different occasions, including pretest, posttest, and delayed posttest in the Deductive group under the influence of treatment sessions based on the Deductive approach.

Table 3

Paired Samples Statistics (the Deductive Group)

		Mean	N	Std. Deviation	Std. Error Mean
Reading	Pretest	18.39	33	3.00	.523
	Posttest	20.03	33	2.65	.461
	Delayed Posttest	19.54	33	2.34	.408

**Table 4***Paired Samples Test (The Deductive Group)*

Reading	Paired Differences						t	df	Sig. (2-tailed)	Eta squared
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference						
				Lower	Upper					
Pretest – Posttest	1.63	1.728	.300	-2.249	-1.023	-5.43	32	.00	.78	
Posttest - Delayed Posttest	.48	1.253	.218	.0405	.9291	2.22	32	.033	.14	
Pretest - Delayed Posttest	1.15	1.856	.323	-1.809	-.493	-3.56	32	.001	.28	

According to the presented data in Tables 3 and 4, the reading mean scores from the pretest ($M=18.39$, $SD=3.00$) to the post-test ($M=20.03$, $SD=2.65$), $t(32) = -5.43$, $p=.00<.05$ (two-tailed) has increased significantly with the mean increase being 1.63 and a 95% confidence interval which ranges from -2.249 to -1.023. The Eta squared value of .78 shows that, with a large effect size, the Deductive approach in teaching information structure of non-canonical sentences predominantly affects the development of reading abilities of EFL learners who participated in this study.

The findings also reveal a deterioration in the reading mean scores from the post-test ($M=.20.03$, $SD=.2.65$) to the delayed post-test ($M=19.54$, $SD=2.34$), $t(32) = 2.22$, $p=.033<.05$. The mean decrease in the reading test scores was .48 with a 95% confidence interval ranging from .4050 to .9291. The Eta squared value of .14 points out a large effect size to conclude that the obtained improvement related to reading proficiency under the effect of the Deductive teaching of information structure of non-canonical sentences did not show stability in retention of reading abilities from posttest to delayed posttest occasions.

Finally, the presented information shows an increase in the reading mean scores from the pretest ($M=18.39$, $SD=3.00$) to the delayed post-test ($M=19.54$, $SD=2.34$), $t(32) = -3.65$, $p=.001<.05$ (two-tailed). The mean increase in the reading test scores was 1.15, with a 95% confidence interval ranging from -1.809 to -.493. The Eta squared value of .28 reveals a large effect size, with substantial differences in the reading test scores obtained from the pretest to delayed posttest occasion. It can be noted that although the Deductive approach in teaching information structure of non-canonical sentences did not show stability in the preservation of EFL learners' reading abilities participated in this study from pretest to posttest occasions. Yet, a significant improvement under the effect of the Deductive approach in teaching information structure of non-canonical sentences can be observed from the pretest to the delayed posttest.



PAIRED-SAMPLES T-TEST (INDUCTIVE GROUP PRETEST-POSTTEST-DELAYED POSTTEST)

Once again, a paired-sample t-test was administered to determine if there was any change in the EFL learners' reading mean scores concerning different phases of the study in the Inductive group under the effect of treatment sessions based on the Inductive approach in teaching information structure of non-canonical sentences.

Table 5

Paired Samples Statistics (Inductive Group)

		Mean	N	Std. Deviation	Std. Error Mean
Reading	Pretest	18.22	36	3.81	.635
	Posttest	19.08	36	3.14	.524
	Delayed Posttest	18.86	36	2.17	.452

Table 6

Paired Samples Test (Inductive Group)

Reading	Paired Differences					t	df	Sig. (2-tailed)	Eta squared
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pretest – Posttest	.86	1.85	.309	-1.488	-.233	-2.78	35	.009	.20
Posttest - Delayed Posttest	.22	1.289	.214	-.214	.658	1.03	35	.30	.029

As tables 5 and 6 reveal, there is a significant increase in the reading mean scores from the pretest ($M=18.22$, $SD= 3.81$) to the post-test ($M= 19.08$, $SD= 3.14$), $t(35) = -2.78$, $p=.009<.05$ (two-tailed). The mean increase was .86, and the confidence interval was 95% ranging from -1.488 to -.233. The Eta squared value of .20 addresses a substantial difference in the reading test scores after the intervention. Accordingly, we may say that the Inductive approach in teaching information structure of non-canonical sentences does have a significant effect on the development of reading abilities of EFL learners who participated in this study.

Based on the information extracted from Tables 5 and 6, no statistically significant difference in the reading mean scores from the posttest ($M=.19.08$, $SD=3.14$) to the delayed posttest ($M= 18.86$, $SD= 2.17$), $t(35) = 1.03$, $p=.30>.05$ (two-tailed) was observed. The mean decrease (deterioration) in the reading test scores (from the posttest to the delayed posttest) was .22, with a 95% confidence interval ranging from -.214 to .658. The Eta squared value of .029 shows no substantial difference in the test scores obtained from the posttest to the delayed posttest occasion. So,



based on the gained results, we may argue that the Inductive approach in teaching information structure of non-canonical sentences did create stability in the retention of reading abilities of EFL learners.

Figure 1

The Deductive group's mean scores in the pretest, posttest, and delayed posttest versus the Inductive group's mean scores in those occasions.

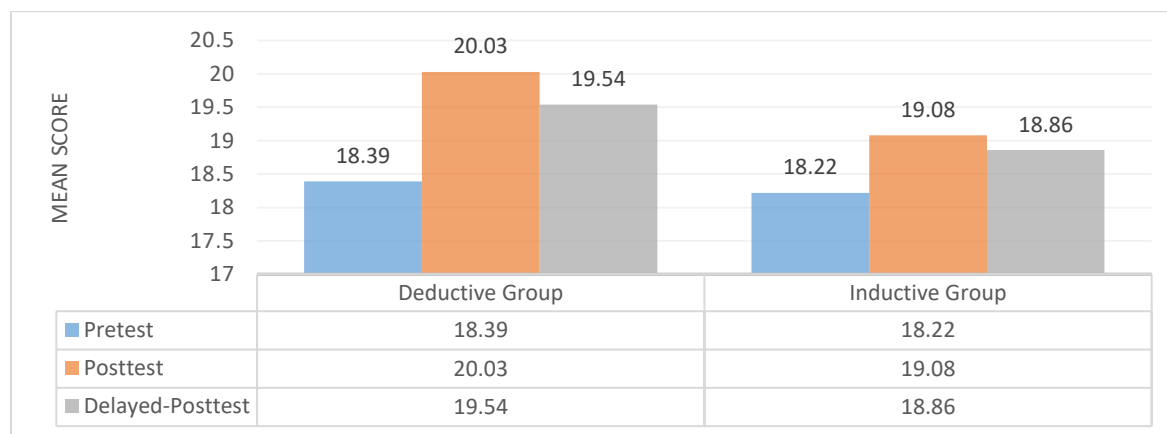


Figure1 shows that in both the Deductive and Inductive groups under the influence of the Deductive/Inductive approach in teaching information structure of non-canonical sentences, a significant improvement in both group's participants' reading proficiency is observable from pretest to post-test; as we can see in figure 1, it seems that the rhythm of progress is sharper when it comes to the Deductive approach in teaching IS of non-canonical sentences. But taking into consideration the results from the posttest to the delayed posttest, it seems the Inductive method in teaching information structure of non-canonical sentences provides the participants with more stability in association with the preservation of obtained reading proficiency.

INDEPENDENT-SAMPLES T-TEST (THE DEDUCTIVE AND INDUCTIVE GROUPS' READING PRETESTS SCORES)

As stated in previous sections, an OPT test was given to provide homogenous groups regarding their general English proficiency. But, the researchers needed two groups of participants who were also homogenous in their reading proficiency. To make between-group comparisons possible, an independent-samples t-test was run in, the pretest phase. Tables 7 and 8 represent no statistically significant difference in the mean scores, based on Reading Test, between the Deductive group ($M = 18.39, SD = 3.00$), and the Inductive group, $M = 18.22, SD = 3.81; t(67) = .206, p = .83 > .05$ (two-tailed). The mean difference = .17 (95% CI: -1.488 to 1.831) was not high and eta squared = .000 indicates no effect size. Based on the guidelines proposed by Cohen, 1988; allant (2020), the eta squared value of .01 indicates a small effect, .06 a moderate effect, and .14 a large effect.



Table 7

Group Statistics (Reading Pretests-the The Deductive and Inductive Groups)

	groups	N	Mean	Std. Deviation	Std. Error Mean
Pretest	The Deductive Group	33	18.39	3.00	.523
	Inductive Group	36	18.22	3.81	.635

Table 8

Independent Samples T-test (Reading Pretests-the The Deductive and Inductive Groups)

Reading Pretests	Levene's Test for Equality of Variances				t-test for Equality of Means					Eta squared
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Equal variances assumed	2.55	.115	.206	67	.83	.171	.831	-1.488	1.831	.000
Equal variances not assumed			.209	65.61	.83	.171	.823	-1.472	1.815	

Accordingly, the statistical results indicate that there is not a significant difference between the Deductive, and the Inductive groups' reading mean scores it can be concluded that both groups stand on the same starting point by and large.

INDEPENDENT-SAMPLES T-TEST (THE DEDUCTIVE AND INDUCTIVE GROUPS' READING POSTTESTS SCORES)

Table 9

Group Statistics (Reading Posttests- The Deductive and Inductive Groups)

	groups	N	Mean	Std. Deviation	Std. Error Mean
Posttest	The Deductive Group	33	20.03	2.65	.461
	Inductive Group	36	19.08	3.14	.524



Table 10

Independent Samples Test (Reading Posttests- The Deductive and Inductive Groups)

Reading Posttests	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		Eta squared
								Lower	Upper	
Equal variances assumed	1.80	.184	1.34	67	.18	.94	.704	-.458	2.352	.000
Equal variances not assumed			1.35	66.54	.18	.94	.698	-.447	2.341	

As Tables 9 and 10 depict, as a result of comparing the posttest scores of the Deductive and the Inductive groups, no significant difference is observed in reading mean scores between the Deductive group (M = 20.03, SD = 2.65) and Inductive group (M = 19.08, SD = 3.14); $t(67) = 1.34, p = .18 > .05$ in posttest occasion. The mean difference = .94 (95% CI: -.458 to 2.352) was not significant. Therefore, researchers may come to conclude that, compared to Inductive group, there is no significant priority in using the Deductive versus Inductive approach in teaching information structure of non-canonical sentences, in EFL contexts, on improvement of reading comprehension scores.

DISCUSSION

This study conducted an investigation on the probable effect/s of making use of Deductive vs. Inductive approach in teaching information structure of non-canonical sentences on Iranian EFL learners' reading comprehension ability. Regarding the pretest to the posttest phase, the results suggest that using a Deductive approach has been accompanied by a significant positive effect on participants who are members of the Deductive group and this provides enough convincing evidence to reject the first proposed null hypothesis. Moreover, the findings show that participants of the Inductive group, under the effect of an Inductive approach, have enjoyed significant improvement as well. Consequently, the second null hypothesis is rejected as well.

Likewise, the findings demonstrate that although in both The Deductive and Inductive groups, a significant improvement is observable from pretest to posttest, in the Deductive group, seemingly, the momentum of progress has been sharper. This finding may approve the essence of Knowles' (1984) notion of andragogy. As Fleming (2018) stipulates, in association with adult learners, practical application of instruction that is openly related to their previous background knowledge is needed. So, a direct mapping of the knowledge they are trying to master is expected in terms



of the knowledge they have already acquired. In second language learning context, such an explicit mapping can be provided through an explicit instruction of structure and grammar.

In association with the posttest to the delayed posttest phase, deterioration of obtained reading comprehension abilities by EFL learners present in the Deductive group has been statistically significant. This may imply that instruction of information structure under the effect of the Deductive approach has not led to acceptable retention of improved abilities. However, the results of the delayed posttest show that the student's reading comprehension abilities improvement compared to the starting point (pretest) is still acceptable.

Concerning the previously mentioned phase, the findings suggest that the deterioration of obtained reading comprehension improvement by the Inductive group's EFL learners has not been statistically significant. Accordingly, researchers may come to the conclusion that teaching information structure of non-canonical sentences under the influence of an Inductive approach enjoys a good retention of improved abilities. Based on the findings, one may be tempted to conclude that when it comes to retention of improved skills related to the EFL learners' reading comprehension, the Inductive teaching approach can have superiority over the Deductive teaching approach. Fleming (2018) maintains that Inductive instruction frequently enhances learners' participation and involvement. This participation often enriches intake. However, the accurate conclusion in this regard requires further research and more comprehensive studies.

When the findings of the first phase of this study (pretest to post-test) are considered, the momentum of improvement in the Deductive group shows more sharpness. However, the findings in the second phase (posttest to delayed posttest) suggest more durability and retention of improved abilities. In this respect, the third hypothesis of this study is rejected too since making use of each approach of the Deductive/Inductive teaching has been accompanied by a specific superiority. However, regarding the revealed information in Section 4.1, no statistically significant difference is being observed in reading mean scores between the Deductive group and the Inductive group posttests' results. In this respect, it seems there is, no significant priority in using the Deductive versus Inductive approach in teaching information structure of non-canonical sentences, in EFL contexts, on the improvement of EFL learners' reading comprehension scores.

Generally speaking, the findings of this study reveal that improvement of syntactic knowledge, increased abilities in phrasal grouping recognition, and word ordering information can lead to an improved comprehension in the stage of reading proficiency. In this regard, our findings align with Grabe and Stoller (2013). Klauda and Guthrie (2008) found that between syntactic processing and reading comprehension, there exists a strong correlation. Likewise, findings of Alderson (1993) show a statistically considerable correlation ($r = .80$) between syntactic knowledge and reading comprehension. The results of the study support and approve the results of these studies.



CONCLUSION

The study intended to shed light on aspects of teaching information structure, and the focus was on those parts of linguistic forms and knowledge, which are usually not given special attention by both EFL teachers and reading teachers. It was shown that raising awareness toward linguistic knowledge, and teaching metalinguistic skills in association with information structure (IS) of non-canonical sentences within the context of the Deductive vs. Inductive approach can impact EFL learners' reading comprehension ability and only the Inductive approach can lead to maximized improvement and retention.

This study is also an attempt to measure the applicability of instructing a linguistic theory, and information structure, in language teaching and learning and aimed to show how it promotes students' communicative competence. For this reason, the Deductive, and Inductive teaching systems were used and the findings revealed the effectiveness of both approaches in teaching information structure of non-canonical sentences, which led to improvement of EFL learners' reading comprehension ability. Regardless of some mentioned priorities related to each process, the findings suggest that both teaching approaches, adopted in this study within the framework of the university context and this age group of students are almost equally effective.

The findings of this study may be pedagogically significant as they pave the way for L2 teachers, teacher trainers, and those who are engaged in curriculum planning, course design, materials development, or adaptation projects to improve more informed instruction, greater teacher awareness, more impressive and expressive teacher inquiry and more effective learning for EFL students if reading instruction is supposed to be applicable and practical for students needs and institutional expectations.

Concerning the present study, one of the significant limitations may be the lack of requirements for applying randomization. Therefore, three intact groups of university EFL learners were engaged. The following studies are suggested to overcome this limitation. On the other hand, the sample size in this study was only 69 students majoring in English at Arak University. Therefore, the results may not be representative of all the EFL university students in Iran. Further research may engage more subjects to achieve more external generalizability. Finally, this study is expected to open new horizons to expand the applicability of the findings in other skills like listening, speaking, and writing, and also in different settings like ESP courses.



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