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Watching Videos and Foreign Language Acquisition: Formulaic Sequences in Focus

Elham Khatami[1]

Ferdowsi University of Mashhad, Iran

Saeed Ameri[2]

University of Birjand, Iran

Hossein Navidinia[3*]

University of Birjand, Iran

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Abstract

The added value of subtitles for learning a language in out-of-classroom settings has been the focus of some scholars over recent years. However, there have only been a handful of attempts at examining the effectiveness of viewing subtitled materials when it comes to incidental learning of vocabulary. The lack of research in the Iranian context is particularly noticeable. Understanding the fact that single words, along with formulaic sequences are essential to language learning, this article offers insights into the incidental learning/acquisition of formulaic chunks and single words among a sample of Iranian students of English who watch the same English full-length TV episode in three conditions: with English subtitles (intralingual subtitles), Persian subtitles (interlingual subtitles) and no subtitles. The study followed a pre-test/post-test between-subject design with a control group. The findings suggested that audiovisual input, regardless of the modality (Persian subtitles or English subtitles) had a positive effect on the participants' overall achievement.

Keywords

multimedia input, subtitled videos, incidental learning, formulaic sequences, single words

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[1] https://orcid.org/0009-0003-2800-3537 | elham.khatamii@gmail.com
[2] https://orcid.org/0000-0001-7706-0552 | s.ameri@birjand.ac.ir
[3] https://orcid.org/0000-0002-3700-1256 | navidinia@birjand.ac.ir

[*] Associate Professor, Department of English Language, University of Birjand, Birjand, Iran

1. Introduction

Using audiovisual materials for language learning has been a representation of oral communication in real settings (Herrero & Vanderschelden, 2019), a topic of interest to researchers since the early 1980s (Price, 1983). With the exponential growth in the volume of audiovisual content such as films and TV series, the role of cinematic products in language learning has become a major research topic in both vocabulary studies and translation studies (e.g., McLoughlin et al., 2020; Teng, 2021). Thanks to the advancement in technology and technological tools, audiovisual material—accessible through various platforms like television, on-demand streaming services, and YouTube—have been accredited with being rich, authentic, and invaluable, offering a myriad of real-life situations and circumstances for learning a language (see Bednarek, 2018). Research so far has shown that watching any form of subtitled videos meaningfully contributes to vocabulary acquisition (Reynolds et al., 2022).

Repetitive natural encounters with language inputs through films or TV series, otherwise known as incidental learning, can lead to receptive vocabulary learning. In terms of formulaic sequences, which is the focus of the present work, empirical research far beyond the Iranian context (Puimège & Peters, 2019, 2020; Pujadas & Muñoz, 2019) has shown that exposure to audiovisual content facilitates incidental learning. The benefit of audiovisual or cinematic productions over other forms of language input "lies in the fact that audio is supported by imagery, and, on some occasions, different forms of on-screen text are present" (Durbahn, 2019, p. 76); therefore, this can boost or facilitate potential language gains, especially lexical development.

Oxford (1990) positions vocabulary as the most incommodious integral of a language, whether a foreign language or mother tongue (Al Ghazali, 2006), and it has hence received more attention in recent decades. Subtitling has been investigated from various aspects (Khoshsaligheh, et al., 2017, 2019, 2020) including their use in language acquisition. As asserted by Parks (1994), subtitled materials may positively impact learners' reading and listening comprehension, decoding skills, vocabulary acquisition, and recognition, as well as their overall motivation by lowering the affective filter (learning blockage) (Zanón, 2006). Vocabulary is best acquired unconsciously, without the attention being centered on language gains (Durbahn, 2019; Rodgers & Webb, 2020). This strategy has been called incidental learning, which is "deliberately leaving the acquisition of these words to potential natural encounters, with the hope of picking them up with or without even the conscious awareness of the learner when enough repetitions occur" (Gu, 2020, p. 275).

Lexical development has proven to be one of the main benefits of exposure to audiovisual materials through various forms of subtitles (Teng, 2021). Subtitles not only assist comprehension but also resolve the connected speech challenge (Wong et al., 2020), for example. Indeed, it is through subtitles that learners notice new words, and noticing is the first step in vocabulary acquisition as Montero-Perez et al. (2014) argue. To date, most empirical studies on incidental learning through subtitles has been devoted to single word learning, hence leaving formulaic chunks or sequences —i.e., collocations, idioms, phrasal verbs, among other forms (Granger & Paquot, 2008)— underexplored (Puimège & Peters, 2020). We know that audiovisual materials "give adequate exposure to L2 FS [formulaic sequences] for incidental learning" (Puimège & Peters, 2020, p. 528). There is also plenty of evidence to show that many Iranians nowadays access foreign cinematic products through subtitles

(Ameri & Khoshsaligheh, 2023), leaving ample room for incidental language learning or learning outside the classroom (Ameri & Ghodrati, 2019). Furthermore, there is robust evidence to support the role of individual differences in accidental learning. For instance, learners' language competency (e.g., vocabulary size, listening skills or overall English ability) has been argued to be an important factor influencing incidental learning (Suárez & Gesa, 2019; Teng, 2022).

Against this backdrop, this experimental research attempts to examine the incidental learning/acquisition of formulaic chunks and single words through watching one English full-length TV episode in three conditions: with English subtitles (intralingual subtitles), Persian subtitles (interlingual subtitles) and no subtitles. The study also examines how students' overall English competence affects their incidental learning. Following a pre-test/post-test between-subject design with a control group, the study addresses these questions:

1. Is there any significant difference in overall achievement scores of incidental learning of single words and formulaic sequences among English-major students watching interlingually- and intralingually subtitled programs?
2. Does the students' level of English proficiency have any effects on incidental learning of single words and formulaic sequences?

2. Literature review

2.1. History of AVT in FL learning

The nature and extent of using technologies for pedagogical purposes depends on needs of learners, learning goals, and the context accommodated (Kirkwood & Price, 2011). Herbart who was a successor to Kant in Formalism said that elements in learning follow an association relation in which the new elements of knowledge shall be connected to learners' prior knowledge; later on, the concept of formalism was reformed by Europeans and the new term *functional rhythm* was coined that considered three activating stages in learning. These stages were commonly known as reception and processing of input and evaluating the output (Oser & Baeriswyl, 2001).

Not long after, spontaneous teaching, initiating with perception, memory, and cognition rather than reception emerged to build linguistic concepts (Oser & Baeriswyl, 2001). This has been similar to the *dual coding theory*, emphasizing the practicality of using pictures to assist memory in order to accelerate knowledge acquisition. The crucial core of this theory is *Memory* as it plays an integral part in learning (Paivio & Clark, 2006). The results of an experiment showed that accrued use of AV aids can provide learners with a wide perception of language and consequently learning (Fernández Jiménez, 2008).

It is believed in a wide variety of pedagogical theories that better learning could be achieved once the *affective filter* is reduced to the lowest amount possible (Krashen, 1985; Vanderplank, 1990); this is reducing fear and hence maximizing their mental potential by providing a comfortable, error-free learning environment. Correspondingly, a study conducted by Borrás and Lafayette (1994) showed that subtitling can be a great source of help as it develops a sense of self-confidence in learners and

reduces their stress level. It is through subtitles that learners have the chance not to miss any important information concurrent with receiving prompt feedback (Borrás & Lafayette, 1994).

As Vanderplak (1988) said, subtitles can make a great deal of authentic, digestible, and user-friendly language input accessible to viewers. However, several studies have recommended this aid and its pertinent features like pace and length to be used with caution and considering the learners' proficiency level (Kothari et al. 2004).

Palmer and West (1997) said the orthographic information provided with subtitles can facilitate vocabulary learning among learners, both implicitly and explicitly. Herron (1995) suggested that the effects arising from such an instrument only emerge in a long-run exposure. Based on research carried out by Baltova, those who have been exposed to video and audio conditions performed twice as good as those merely hearing the audio (Danan, 2004).

2.2. Incidental vocabulary learning and acquisition

According to Krashen (1982), there are two systems involved in learning a foreign language, commonly referred to as acquisition and learning systems, which respectively deal with the subconscious and conscious processes. In the former, acquirers are unaware of what they are acquiring, and no direct instruction is targeted to learners (Hulstijn, 2001). Incidental or unconscious learning of words occurs when no intention is at work to commit the intended lexical item to memory (Hulstijn, 2013). Teng (2016) believed that incidental vocabulary learning in reading relies on a number of variables, such as students' word level and the context of word usage. To Teng (2016), this vocabulary knowledge is beyond the superficial knowledge of the word, and it covers various aspects of deep vocabulary knowledge including orthography, function, meaning, syntax and form.

Having a concrete knowledge of the rules and structures of another language, whether a second or a foreign one, is an indispensable part of the learning system. Krashen's (1982) hypothesis, the affective filter is similar to what Vygotsky would call *real-life tasks* (Vygotsky & Cole, 1978) and made a point of enhancing a non-threatening learning environment (Nor & Ab Rashid, 2018); Here is where AVT utilization aptly serves the purposes of foreign language acquisition. This incidental learning was asserted by many, including Schmidt (1994), Kweon and Kim (2008), and Yali (2010) to be the best approach for vocabulary retention and recall. According to Lertola, standard subtitles positively affect the retention of lexical information (McLoughlin, 2018). Subtitles can enhance the benefits of multimodal input thanks to the naturalistic setting they provide (Pérez-Serrano et al., 2021).

2.3. Single words and formulaic structures

Under the superordinate of lexical elements, there is a subset named formulaic sequences (FS). Granger and Paquot (2008) introduced five distinguished categories for these formulaic sequences including lexical collocations, idioms, binomials, grammatical collocations, and phrasal verbs. These sequences of words may not be fully predictable and par the course concerning their meaning, function, and features of structure, which creates immense challenges for learners (Wray, 2013). These strings of words used to be the core of language pedagogy as they constitute 20 to 50 percent of the discourse, hence communicating a great deal of meaning. According to Jackendoff (1995), this category is equal

in size or perhaps larger than the single words category. As stated by Schmitt (2008), incidental learning of single words is a slow process occurring in several exposures, whilst the same thing has not been widely probed concerning formulaic sequences (Alali & Schmitt, 2012). FS studies suggested the inefficiency of incidental learning in the case of these longer sequences (Meunier, 2012).

2.4. Memory, recall and recognition

Memory plays a crucial role in language learning and performance. Hintzman (1990), Richardson-Klavehn and Bjork (1988), and some other memory researchers stated that non-declarative memory commonly referred to as implicit or unconscious memory has two major processes and systems known as recall and recognition (Haist et al., 1992). Concerning recall memory, the lengthier the input, the more energy and time required to grasp and master; In recognition memory, however, an increase in the number of impetuses leads to better recognition, which has been noted to be two times more than recalling of information. Human memory tackles two general processes of recall and recognition. In recall, one vividly remembers the general setting, background, or associations of something, but not the focal elements, which are the things that are noticed by viewers upon seeing the image. In recognition, this focal element can be present in the mind, and the plausibility of recalling the general theme or setting in which the element occurred is being investigated. Recognition is linked to partial familiarity with an element. Some had argued that a better recognition influences a better recall, while it is not the case for all (Hollingworth, 1913).

As contended by Danan (2004), subtitiles alongside the same language soundtrack can facilitate comprehension (Teng, 2019) and lead to more satisfactory results in vocabulary learning (Peters et al., 2016). As reported by the University of Cambridge, the simultaneous display of spoken and written channels enhances memory recognition thereby improving word recognition (Bird & Williams, 2002).

2.5. Lexis acquisition via subtitles

Deep knowledge of new vocabularies in a foreign language is gained through exposures in various contexts (Horst et al., 1998). Extramural activities such as games and media in that particular foreign language have been suggested to be effective in the learning process (Arnbjörnsdóttir, 2018).

Vocabulary acquired through audiovisual materials can be used both actively in recalling and production, and passively in recognition and comprehension. It is of crucial importance for the material to promote contextualized language learning rather than propelling learners' attention toward mere content and meaning, like what normally occurs in some audiovisual genres, such as a TV weather report, or a documentary (Ruusunen, 2011). Interlingual subtitling has been proven to contribute to learners' comprehension, whereas intralingual subtitling seems to foster lexical acquisition among learners (Bird & Williams, 2002).

In various experimental studies, disparate lexical tests were used to measure the learning of such linguistic elements. These tests along with a brief explanation of the nature of the test and its purpose are presented below:

2.5.1. Form and meaning recognition

Learners were given a set of incomplete sentences along with numerous multiple choices. They were supposed to choose the correct option among distractors constituted of one part replacement in the same part of speech with an almost relatable meaning to the original word. Meaning recognition tests were also used to evaluate learners' recognition of the accurate meaning of the lexicon (Montero-Perez et al., 2014).

2.5.2. Form/meaning recall

In this section, test-takers were provided with a short description or translation of the target element and were asked to complete the incomplete target word written. Translation tasks and questions were also implemented in the meaning recall realm (Puimège & Peters, 2019).

Several studies probed into the beneficial effects of subtitled material on foreign language learning. In an empirical study carried out in 2014, the impact of subtitled or captioned videos was examined on a population of 133 Flemish undergraduates to check any possible changes in learners' vocabulary achievement. These students were split into four groups and exposed to four discrete types of captions, i.e., no caption, keyword captions, full captions, and full captions plus keywords highlighted. The results of this study revealed learners' positive achievement in the realm of word form and word meaning recognition with full and keyword captioning, while word form recall and meaning comprehension remained a challenge (Montero-Perez et al., 2014).

In another study, the researchers investigated the impact of inter/intralingual subtitles. Students were being tested on their acquisition of vocabulary, phrasal verb, and idiomatic expressions of English. A questionnaire of learners' watching habits was distributed, indirectly impacting their incentive and preferences prior to the experiment, consequently enhancing their chance to succeed (Harmer, 2001; Bravo, 2010). The results proved no significant differences, partly due to learners' inability to master their MT yet.

Various forms of subtitles were examined in pedagogical settings in order to scrutinize lexical acquisition, as in recent research in Iran investigating the efficacy of reversed, standard and no subtitle (Mardani & Najmabadi, 2016). However, the study of subtitles tailored based on some academic standards rather than those created by amateur subtitlers disregarding the conventions and standards in place is an under-researched area. The main objective of the current study is to determine the results achieved from different subtitles, as well as the possible correlation between learners' language proficiency levels and their overall performance.

3. Method

3.1. Participants

The sample of this experimental study includes 63 first-year university students (20 males and 43 females), who studied English as a foreign language (either translation or literature) in Iran. They all spoke Persian as their mother language and English as a foreign language. Their age ranged from 18

to 30 years old (*M:* 24, *SD:* 0.15). They were chosen based on convenience sampling, and they received course credits for their voluntary participation. The participants were divided randomly into three groups: two experimental groups who watched a video with Persian subtitles (*n*=23) and English subtitles (*n*=19), and a control group who watched a video without subtitles (*n*=21). Their English proficiency was also determined according to which 15 participants fell into the beginner level, 30 into the intermediate and 18 into the advanced groups. We followed Dörnyei's (2007) recommendation for the minimum sample size in experimental studies; at least 15 participants per group (p. 99).

3.2. Material

Materials chosen for this study had to meet several requirements. The present work was conducted in an Islamic setting, which demands the use of culturally appropriate materials. Secondly, because the study was conducted online, a full-length film could not be used; therefore, we resorted to sitcoms, where a 20-minute episode can serve the purpose of the study. Thirdly, the same episode from the TV series was used for all groups, which has been common among many studies (e.g., Birulés-Muntané & Soto-Faraco, 2016).

Based on the literature, the audiovisual materials intended to be utilized for educational purposes and in pedagogical settings are required to be selected sensibly in a way that meet the linguistic needs and abilities of the learners (Teng, 2022). Its language ought to be comprehensible and in a standard accent conventionally heard by learners. The authentic material chosen for this research had to be one that was less likely to have been seen by the participants so that the learning impact could be properly measured.

The audiovisual material for this study was the 1993 American sitcom *Frasier* (season 8, episode 4). This episode was about 21 minutes long. Since the series had not been subtitled into Persian, the subtitles were crafted and created by the first researcher using Subtitle Edit (version 3.5.11). The subtitles were based on the *NETFLIX* subtitling standards. The final set of Persian subtitles were checked and proofread by the third researcher, who is a professional subtitler. The subtitles were burnt into this 21-minute-long video file, which was uploaded on an Iranian upload center (www.namasha.com) so that the participants could watch it online at home. The English subtitles were acquired from https://subscene.com.

3.3. Instruments

3.3.1. Placement test

A standard, widely accepted test was required to measure the learners' language ability. Due to the online nature of the study, a well-recognized online test was chosen: *EnglishScore: Free British Council English Test*. This test measures the four core language skills, namely grammar, vocabulary, listening and reading (Anton, 2021). This placement test took 40 minutes to complete on average and test takers were given a *CEFR* score ranging from A1 (beginners) to C2 (language masters). Accordingly, 15 participants fell into the beginner (A1-A2) group, 30 into the intermediate (B1-B2) group and 18 into the advanced (C1-C2) group.

3.3.2. Target formulaic sequences and single words

A standard Google form questionnaire was employed. The format and type of questions were inspired by two similar works (Frumuselu et al., 2015; Puimège & Peters, 2019), examining the incidental learning of single word and formulaic structures through exposure to audiovisual material.

To devise the test measuring the participants' learning outcomes, previous studies were reviewed (Frumuselu et al., 2015; Puimège & Peters, 2019). Initially, 41 items were chosen for the test, which included both single words and formulaic sequences from the video. To ensure the validity of the test, the items were piloted three times on a group of students. Subsequently, the questions that received over 25 percent correct answers (six questions) were excluded from the final test. To mitigate carryover effects, the order of items in pre-test and post-test was different. Given the various aspects of learning lexical items (Puimège & Peters, 2019), the vocabulary test was designed to measure learners' learning outputs at the form and meaning levels (on two dimensions of recall and recognition). The reliability of the test was found to be 0.81 using Cronbach's alpha.

The first test measured form recognition through multiple-choice questions:

1. We will have to give her a good ------- when she leaves the office.

a. send-force b. send-away c. send-out d. send-off

The second test measured meaning recognition by multiple-choice questions with options in the participants' mother tongue:

2. He made a nice spin on what I propose.

a. به‌خوبی پیچاندن b. انتقاد مثبت c. به درازا کشاندن d. پیشنهاد خوب

In the third part, the recall of form was assessed by supplying the form of a given meaning in both English and Persian. The first letter and the number of letters were given as a hint:

3. Going to a party that you are not invited: c- - - - a p- - - - (10 letters)

4. C - - - - - - (7 letters) منفی باف

Lastly, the recall of meaning was measured through translation or description:

5. Stand on ceremony: -------

3.4. Procedures

The data were collected online in two sessions. The participants completed the language competency test and the pre-test three weeks before the viewing sessions. There were three conditions: one group watched the clip with no subtitles, another group watched the clip with Persian subtitles and the last group watched it with English subtitles. Immediately after watching the clip, the link to the online post-test was shared among the participants. The time between the pre-test and post-test was 3 weeks.

Due to the covid-19 pandemic and the imposed lockdowns, participants completed the test at home; they were asked not to check a dictionary or any other resources during the pretest. They were also assured anonymity and confidentiality before the experiment.

4. Results

To answer the research questions, univariate covariance (ANCOVA) and multivariate covariance (MANCOVA) were performed in SPSS. To reduce the instance of a false positive, an analysis of variance (ANOVA) and a Bonferroni post hoc test were employed. The independent and dependent variables of the study can be seen in Table 1. It is worth mentioning that the overall achievement/score is the sum of all the lexical aspects.

Table 1. Research variables

Independent variables
Inter and intra lingual subtitles
Learners' proficiency levels
Dependent variables
Participants' overall achievement after the treatment
Participants' meaning scores after the treatment
Participants' form scores after the treatment
Participants' recall scores after the treatment
Participants' recognition scores after the treatment

Table 2. Descriptive statistics of the control and two treatment groups

		Control Group		Persian Subtitle Group		English subtitle Group	
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Overall	Pre-test	0.10	0.10	0.13	0.12	0.10	0.10
score	Posttest	0.18	0.15	0.21	0.17	0.21	0.15
Meaning	Pre-test	0.12	0.12	0.14	0.16	0.13	0.22
scores	Posttest	0.21	0.18	0.26	0.20	0.18	0.16
Form	Pre-test	0.08	0.10	0.11	0.11	0.07	0.08
scores	Posttest	0.16	0.15	0.16	0.16	0.20	0.15
Recall	Pre-test	0.12	0.12	0.16	0.15	0.11	0.13
scores	Posttest	0.22	0.19	0.20	019	0.30	0.23
Recognition	Pre-test	0.10	0.11	0.13	0.12	0.12	0.10
scores	Posttest	0.19	0.16	0.25	0.15	0.18	0.13

Descriptive statistics in Table 2 suggest that all the control and treatments groups achieved a higher score in terms of overall score, meaning score, form score, recall score and recognition score in the post-test. This means that the audiovisual input has a positive effect on the learning acquisition output (Table 2). We further examined the differences between the groups in terms of their achievement.

The results of an ANOVA (one-way) test between the control and experimental groups showed no significant difference between the control and experimental groups in their overall achievement in the post-test (sig=0.846 & 0.692). In another test, the control group was set aside and the two experiment groups were compared to check the difference between these two. Due to the skewed distribution of data, the Mann-Whitney U test was used, the result of which depicted no significant difference between the two experimental groups (sig=-0.076). Overall, it appeared that the presence of Persian or English subtitles had no effect on the participants' overall achievement in terms of accidental acquisition of lexis.

Table 3. Descriptive indicators of the scores in pre-test and post-test stages in control, English subtitle and Persian subtitle groups sorted by participants' proficiency levels

		Control Group		Persian Subtitle Group		English subtitle Group	
		M	SD	M	SD	M	SD
A Beginner level (A_1 & A_2)	Pre-test	0.02	0.04	0.13	0.03	0.14	0.18
	Posttest	0.07	0.06	0.15	0.04	0.05	0.04
B Intermediate Level (B_1 & B_2)	Pre-test	0.08	0.05	0.09	0.09	0.06	0.04
	Posttest	0.17	0.11	0.19	0.14	0.21	0.11
C Advanced level (C_1)	Pre-test	0.20	0.12	0.20	0.19	0.15	0.09
	Posttest	0.31	0.19	0.30	0.26	0.31	0.16

The mean score in group A saw an increase in the Persian subtitle group (0.13 to 0.15) and control group (0.02 to 0.07) after the intervention, whereas the same score declined in the English subtitle group (0.14 to 0.05). This can potentially signify source language subtitle's inadequacy in the beginner learners. The overall achievement of intermediate (group B) and advanced (group C) participants improved, regardless of the type of intervention they received (Table 3).

Table 4. Descriptive indicators for beginner learners (group A)

		Control Group		Persian Subtitle Group		English subtitle Group	
		M	SD	M	SD	M	SD
Meaning scores	Pre-test	0.04	0.06	0.12	0.07	0.23	0.37
	Posttest	0.08	0.08	0.16	0.09	0.05	0.04
Form scores	Pre-test	0.01	0.02	0.14	0.12	0.04	0.03
	Posttest	0.06	0.06	0.14	0.07	0.06	0.05
Recall scores	Pre-test	0.02	0.04	0.17	0.10	0.15	0.23
	Posttest	0.09	0.11	0.16	0.08	0.06	0.04
Recognition scores	Pre-test	0.02	0.04	0.11	0.09	0.13	0.11
	Posttest	0.08	0.08	0.18	0.12	0.06	0.07

Here, we examined the variables of the study one by one[1]. Participants with a beginner level of English scored higher in their post-test meaning test in the Persian subtitle group (0.12 to 0.16) and no subtitle (control) group (0.04 to 0.08). In contrast, their scores dropped after watching the material with English subtitle (0.23 to 0.05). Form results among these participates demonstrate another increase in the control group (0.01 to 0.06) and English subtitle group (0.04 to 0.06) after the treatment, while it remained unchanged in the experimental group of Persian subtitles (0.14 to 0.14).

A comparison between the recall mean scores in pretest and post-test suggests the inefficiency of subtitles in better recall; However, watching the movie without a subtitle led to better recall.

Similar outcomes can be reported for beginners in the Recognition section, which was a reduction in scores in the intralingual subtitle group (0.13 to 0.06) and a boost in interlingual (0.11 to 0.18) and control groups (0.02 to 0.08). Overall, English subtitles seemed to be the least effective for beginners.

Intermediate and advanced learners' mean scores in all levels of meaning, form, recall, and recognition improved in all three study groups in the post-test. The results of a Bonferroni test for comparing pairwise-disjoint groups point out a difference between the Persian and English subtitle groups.

A multivariate analysis of covariance (MANCOVA) test was conducted to examine the differences between beginner level learners' scores in the two sections of Meaning and Form among all three groups. A test statistic in multivariate analysis known as *Roy's Largest Root* was run, where increasing values are related to the effects contributing more to the model. Based on the results of *Roy's Largest Root*, the concurrent effect (multivariate) of subtitle on participants' scores in the two discrete sections of Form and Meaning was approved ($p<0.05$).

A one-way ANCOVA was conducted to compare the effectiveness of the subtitled material while considering a control group receiving no subtitles. Levene's test and normality checks were carried out and the assumptions were met. There was a significant difference in the mean meaning score [$F=6.05$ & $p=0.01$]. Again, a Bonferroni test was used to determine the disparity and difference between groups.

According to Table 5, the results show a great disparity between learners' scores in meaning between the two groups of English and Persian subtitles, with learners in the latter group achieving higher scores. The difference in the values of statistical significance illustrates a disparity between the control and Persian subtitle groups, which is very close to the difference threshold.

Based on the results of the multivariate test statistic ($p=0.081$ & $F=3.273$), concerning post-test recall and recognition scores, the concurrent effect (multivariate) of subtitle on participants' scores in the two discrete sections of *Recognition* and *Recall* was not approved ($p>0.05$).

According to the results of the between-group Covariance analysis of post-test scores in the variables of *Recognition* and *Recall*, no significant changes were found in beginner learners' scores after the intervention. The results of an ANOVA test and the p-value (0.74) suggested no significant difference

[1]. Meaning Score

between intermediate participants' mean scores among the three groups of Control, Persian and English subtitles.

Table 5. Bonferroni test for comparing pairwise-disjoint groups of control, Persian and English subtitle

			Mean difference	Standard Error	Statistical significance (*p-value*)
Meaning	English Subtitle	Persian Subtitle	-0.17	0.05	0.02
		Control group	-0.03	0.05	0.99
	Persian Subtitle	English subtitle	0.17	0.05	0.02
		Control group	0.14	0.05	0.06
	Control group	English subtitle	0.03	0.05	0.99
		Persian Subtitle	-0.14	0.05	0.06

Based on the results of *Roy's Largest Root test* (p=0.003 & F=7.484), the concurrent effect (multivariate) of subtitle on intermediate participants' scores in the two discrete sections of *Form* and *Meaning* was approved (p<0.05). The participants' scores in form pertinent questions significantly changed in this group.

A Bonferroni test was used to determine the disparity and difference between groups.

Table 6. Bonferroni test for comparing pairwise-disjoint groups of control, Persian and English subtitle

			Mean difference	Standard Error	Statistical significance (*p-value*)
Form	English Subtitle	Persian Subtitle	0.13	0.04	0.01
		Control group	0.08	0.04	0.26
	Persian Subtitle	English subtitle	-0.13	0.04	0.01
		Control group	-0.05	0.04	0.60
	Control group	English subtitle	-0.08	0.04	0.26
		Persian Subtitle	0.05	0.04	0.60

The results revealed a great disparity between learners' scores in form between the two groups of English and Persian subtitle. Those who had watched the English subtitled version of the series scored higher than those receiving the Persian subtitle. This speaks to the significant effect of English subtitle on communicating the form of the lexical structures to learners with an intermediary knowledge of English.

Based on the results of the multivariate test statistic (p=0.000 & F=11.604), the concurrent effect (multivariate) of subtitle on intermediate participants' scores in the two discrete sections of *Recognition* and *Recall* was approved (p<0.05). Participants' score in group B (intermediate learners) had not significantly altered in *Recognition* questions. The results of an ANOVA test and the p-value (0.97) revealed no significant difference between advanced participants' mean scores among the three groups of Control, Persian and English subtitles (0.00).

Based on the results of a MANCOVA test for advanced learners (p=0.569 & F=0.590), the concurrent effect (multivariate) of subtitle on participants' scores in the two discrete sections of Form and Meaning was not approved (p>0.05).

According to the results of between-group Covariance analysis of post-test scores in the variables of *Meaning* and *Form*, the participants' scores in *Form* (p=0.58) and *Meaning* (0.80) pertinent questions had not significantly changed in this group.

Based on a multivariate covariance analysis of advanced learners' recall and recognition scores in the post-test (p=0.462 & F=0.126), the concurrent effect (multivariate) of subtitle on participants' scores in the two discrete sections of *Recognition* and *Recall* was not approved (p>0.05). Concerning the Covariance analysis between *Recall* and *Recognition*, no significant changes can be deduced in advanced learners' scores after the intervention.

Overall, although the intermediate and advanced students demonstrated an upward trend in all their scores, beginners did not follow the same trend at all levels. Among beginners who watched the video with English subtitle, almost all categories were negatively impacted, except the form of those targeted lexical elements which showed an improvement compared to pre-test scores. In the same group of participants, the Persian subtitled video proved to exert no effects on form scores, while a reducing impact was reported in the recall ability of students after receiving the aforementioned AVT mode.

The results of this study can be summarized as follows:

Table 7. Overall results

	Beginner			Intermediate			advanced		
	Control	Persian	English	Control	Persian	English	Control	Persian	English
Overall	↑	↑	↓	↑	↑	↑	↑	↑	↑
Meaning	↑	↑	↓	↑	↑	↑	↑	↑	↑
Form	↑	Unchanged	↓	↑	↑	↑	↑	↑	↑
Recall	↑	↓	↓	↑	↑	↑	↑	↑	↑
Recognition	↑	↑	↓	↑	↑	↑	↑	↑	↑

5. Discussion

The findings of the present article offer important insights into the extent to which incidental learning of single words and formulaic sequences can be achieved through watching subtitled TV series and how students' proficiency level affects such learning. ANCOVA and MANCOVA results suggested that watching a video with subtitles or without subtitles significantly affects students' incidental learning of formulaic sequences.

Despite studies that would consider the efficacy of subtitles tightly tied to its exposure length, with no evident developments in short exposures (d'Ydewalle & Pavakanun, 1997; van de Poel and d'Ydewalle, 1999; Ghia, 2007, 2011, 2012), this experiment suggested the benefits of subtitles in short-term. Moreover, the related literature introduced the 'frequency of occurrence' as a key factor for vocabulary learning and remembering (Ellis, 2003; Sabouri et al., 2015). This experiment, however, demonstrated that even in the case of words that show up once, learning does take place. On the other hand, the bulk of research provided evidence for the effectiveness of subtitles, while only a few, including Reese (1984) proposed the hindering impact of this mode of translation on learners due to the cognitive load it may bring (Naghizadeh & Darabi, 2015). This could have been true about beginners receiving intralingual subtitled material. Supporting the view of those asserting the existence of a relationship between a language's prior knowledge and later achievements in the same language, learning lexis through subtitles occurs with a higher success rate among those who already possess a relatively adequate knowledge of the language.

The results of this study suggest that interlingual subtitles are most appropriate for beginners while for the Intermediate learners the most had been attained in the meaning and recognition via Persian subtitle, and more form and recall in the English version. Advanced participants performed significantly better following the intralingual subtitles, except in form subsection which benefitted equally from both subtitles. In a similar study carried out in 2015, reversed subtitles proved to be the most influential in incidental vocabulary acquisition (Gorjian, 2015); the same results were obtained in another study (Holobow et al., 1984). According to the results, although MT proved to be effective in learning new words, the outcome for each mode of subtitle was different from the findings of previous studies. According to another study, bimodal subtitle stands the first, followed by the standard mode, and lastly, the reversed one concerning their effectiveness in vocabulary Recognition and Recall areas, and this seems to differ from the outcomes of the current study (Zareei, 2009).

Accordingly, form recall was significantly influenced by the subtitles even though Bitchener and Nation (2001) considered these questions to be far more demanding than meaning recall and recognition and no conclusion had been drawn in that project concerning the impact of AVT on meaning recall (Puimège & Peters, 2019). In this experiment, Form and Recall were the two most impacted areas of language, particularly in the English subtitled and control groups. Learners can benefit from subtitling regardless of their proficiency level (Frumuselu et al., 2015). Concerning the disparity between learners' achievements among the three linguistic differentiated groups, a Bonferroni test exhibited an immense gap between beginner and advanced participants regarding their recognition ability, where advanced learners scored significantly higher than beginners. Similar results were found for students' recalling ability with a stepped approach; accordingly, advanced participants outperformed intermediate ones, who themselves achieved higher than the beginners. Duplicate results were achieved concerning Meaning questions.

Overall, interlingual subtitles seem to be most appropriate for beginners, while the same issue varied for intermediate ones, proving more achievements in the Meaning and Recognition via Persian subtitle, and more Form and Recall in the English version. Advanced participants were significantly better with the intralingual version rather than the standard one, except in the Form subsection, which benefitted equally from both subtitles.

6. Conclusion

The overall goal of this paper was to scrutinize incidental learning/acquisition of single words and formulaic chunks through watching a full-length English-language TV episode with or without subtitles. To examine incidental vocabulary learning outcomes, an experiment with a select group of Iranian major-English university students was carried out. In addition, learners' English proficiency levels were taken into account for the analysis. The overall findings evinced the potential of audiovisual input with subtitles in incidental learning/acquisition of formulaic chunks to varying degrees. Therefore, subtitled videos are suggested for enhancing and encouraging incidental vocabulary learning either in the classroom settings or at home as an independent language activity. As Teng (2022) argues, they can also "offer psychologically motivational stimuli, including motivation, visual support, and recycling of lower-frequency words" (p. 10).

Since this research was launched in 2021, the researchers faced restrictions imposed by the Covid-19 outbreak, including limited accessibility to participants. Only 63 Iranian EFL undergraduates volunteered to partake in the experiment. Future studies can rely on a larger sample size to draw generalizable conclusions. Future research may also address further facets including learners' reception, comprehension, reactions, and learning strategies when watching fast-paced films and TV series with a more complex plot. Additionally, longitudinal studies are required to examine the long-lasting effects of this sort of short exposure on memory and production. Lastly, other learner-related factors, such as learners' aptitude or their interest in subtitles or viewing habits can be examined to see how they affect incidental learning of formulaic sequences. To better understand if language gains are retained, future investigations should tap into the learning process; in other words, "how learners respond to incidental gains in vocabulary knowledge" (Webb, 2020, p. 232); for example, if they jot down new collocations and idioms or if they review their notes later.

Disclosure statement

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About the authors

Elham Khatami has a master's degree from Ferdowsi University of Mashhad. Email: elham.khatamii@gmail.com

Saeed Ameri is Assistant Professor in translation studies at the University of Birjand. Email: s.ameri@birjand.ac.ir

Hossein Navidinia is an Associate Professor in applied linguistics at the University of Birjand. Email: navidinia@birjand.ac.ir