

John Benjamins Publishing Company



This is a contribution from Translation, Cognition & Behavior 4:2
© 2021. John Benjamins Publishing Company

This electronic file may not be altered in any way. The author(s) of this article is/are permitted to use this PDF file to generate printed copies to be used by way of offprints, for their personal use only.

Permission is granted by the publishers to post this file on a closed server which is accessible only to members (students and faculty) of the author's/s' institute. It is not permitted to post this PDF on the internet, or to share it on sites such as Mendeley, ResearchGate, Academia.edu.

Please see our rights policy on <https://benjamins.com/content/customers/rights>

For any other use of this material prior written permission should be obtained from the publishers or through the Copyright Clearance Center (for USA: www.copyright.com).

Please contact rights@benjamins.nl or consult our website: www.benjamins.com

Eyetracking the impact of subtitle length and line number on viewers' allocation of visual attention

Saber Zahedi & Masood Khoshsaligheh
Ferdowsi University of Mashhad

Compared to one-line subtitles, two-line subtitles are believed to receive more attention from viewers based on previous research. Yet, in the majority of these studies, two-liners are considerably longer than the one-line subtitles. The authors argue that the findings of the previous studies could have been affected by the difference in subtitle length, and there is a need to operationally distinguish between the impact of subtitle length and line number on viewers' attention allocation. Therefore, an SMI eye tracker was used in this study to record the eye movements of 32 Iranian viewers while reading the Persian subtitles of a short segment of a feature film, *A Prophet* (Jacques Audiard 2009). The results showed that the viewers' attention to one-line subtitles was significantly greater than the attention they allotted to two-line subtitles although they were of the same length. The attention allocated to the long subtitles was also significantly greater compared to the attention paid to the short subtitles. Retrospective interviews also showed that the participants favored short and two-line subtitles.

Keywords: eye tracking, subtitle reception, line number, subtitle length

1. Introduction

Today, the circulation of information and cultural content happens, in a large part, through multimedial and multimodal products. The role they play in our life is increasingly important, and, over the past few years, the number of studies on multimodal communication has been growing steadily despite AVT still being in its early ongoing stages of development. This owes much to the mass production of audiovisual and digital products, which is far beyond the production of films and TV shows, not to mention the impact of the Internet, which has given a completely different meaning to the distribution of such multimodal products

by rendering them global, unlimited and ubiquitous (see Doherty 2016). The rising forms of media production and distribution are affecting the AVT academia as well as the professionals (Díaz Cintas 2013) by creating novel research trajectories, new market opportunities, and rapid circulation of media products.

In audiovisual products, several semiotic systems are intertwined, forming a multisemiotic or multimodal channel of communication. In using subtitled materials, viewers need to constantly divide their attention between the subtitles, soundtrack and moving images, which is a far more complicated act compared to reading a plain text with no visual accompanying element (Perego 2008). In case of subtitles, many believe that given the simultaneity of visual and verbal elements, audiences might experience difficulty in their perception process (Lautenbacher 2012). Previous studies have shown that subtitle reading could be affected by a number of textual and non-textual factors such as line breaks and segmentation (Perego 2008; Perego et al 2010; Gottlieb 2012; Gerber & Szarkowska 2018), age (d'Ydewalle & De Bruycker 2007; Muñoz 2017), translation strategy (Caffrey 2009; Ghia 2012), display duration (d'Ydewalle et al 1991), shot changes (Krejtz et al 2013), synchronization (Lång et al 2013), linguistic factors (Moran 2012; Krejtz et al 2016), hearing condition (Krejtz et al 2016; Szarkowska et al 2013) and subtitle length and line number (Szarkowska & Gerber 2019).

Despite the fact that subtitle length and line number are other two important variables that may affect the process of subtitle reading, there are not sufficient studies on these two elements. Díaz Cintas & Remael (2007) state when the characters exceed 39–40 per line, the subtitle is broken into two shorter lines (also see Mosconi & Marco 2012). This means that subtitles with more than 40 characters are not normally accommodated in one line. Yet, there is a lack of empirical evidence for the mentioned instructions on subtitle line number, and little is known about the impact of line number on subtitle processing and cognitive load. Previous research has shown that readers tend to pay more attention to two-line subtitles (d'Ydewalle et al 1991; d'Ydewalle & Gielen 1992; d'Ydewalle & De Bruycker 2007) when two-line subtitles are lengthier than one-line subtitles. In other words, in previous studies focusing on line number, the characters of two-line subtitles surpassed those of one-line subtitles. However, this study will investigate the differences in attention allocation to one-line and two-line subtitles that include more than 40 characters, and they are both of the same length and duration on the screen. The study will also investigate the impact of subtitle length when the line number remains constant. In other words, we investigated the reading of subtitles with different character number (one shorter and one longer) while the number of lines were the same for both versions.

2. Literature review

2.1 Subtitle reading

Cognition research on translation and subtitling using eyetracking has gained ground over the last decade. A number of articles, books and dissertations have been written on the issue with each addressing a particular aspect ranging from formal features to textual elements (see an entire volume on the issue edited by Perego 2012). Most of such studies seek the details of attention to the visuals and cognition of translators or other individuals engaged in producing or receiving translation.

Studies have shown that eye movements do not flow linearly and smoothly, but eyes make dynamic and rapid movements from one point to another (Ghia 2012). These movements are known as saccades, and the millisecond pauses between are fixations (Duchowski 2017). Visual perception process is constantly disrupted and affected by a number of external and contextual factors (Ghia 2012). When watching a subtitled video, such factors vary from visual ones such as subtitles font (e.g., size, color and type), subtitle display duration, line-breaks, source language familiarity and number of characters to more textual factors such as cohesion, lexical frequency and cultural references. In a study on the readability of subtitles, Perego (2008) discovered instances of arbitrary line-breaks. The term 'arbitrary' referred to unpredictable, illogical, inaccurate or implausible. A Line break is called arbitrary as coherent groups of words are divided and segmentation does not happen with the highest syntactic node. She found that at the phrase level, following phrases should be placed on the same subtitle line: noun phrases (nouns preceded by an article); prepositional phrases (simple and/or complex preposition heading a noun or noun phrase); and verb phrases (auxiliaries and main verbs or phrasal verbs). At the clause and sentence level, she found that the following structures should be kept on the same subtitle line: coordination constructions (sentential conjunctions such as *and* and negative constructions with *not*); subordination constructions (clauses introduced by the conjunction *that*); if-structures and comparative constructions (clauses preceded by the conjunction *than*). In a ground-breaking study, d'Ydewalle et al (1987) focused on the famous 'six-second rule', which holds that the optimal duration for subtitle display is 6 seconds (also see Szarkowska & Bogucka 2019). Ghia (2012) tested the different effects of literal and free translation strategy on the reading of subtitles and declared that nonliteral translation raises the number of deflections in subtitle reading. Deflections were "shifts to various message components typically occurring in complex input environments like the multimodal one; more specifically, they involve motion along a vertical dimension. In subtitled audiovisual input,

deflections consist of further fixations on the subtitles after prior subtitle reading and image watching” (Ghia 2012:171). Moran (2012) explored the impact of linguistic factors on reading subtitles under the assumption that particular lexical choices can boost comprehension with positive mnemonic effects, which all happen through increasing cognitive effort. The results showed higher processing difficulties associated with low-frequency and low-cohesion subtitles. Krejtz et al (2016) investigated the reading of function and content words in intralingual and interlingual subtitles and found that the function words were given less visual attention compared to the content words. Lång et al (2013) studied the effect of badly synchronized subtitles on the gaze paths of television viewers through eye tracking. They found that there was a significant relationship between subtitle length and cognitive efforts invested by the viewers.

Despite the mentioned factors and difficulty of reading multi-semiotic texts, subtitle reading is an automatic behavior (d’Ydewalle et al 1991), and it takes place as subtitles begin to show up on screen. d’Ydewalle & Gielen (1992) believe that this automatic behavior seems to be true regardless of age, sex and translation method of subtitling. As d’Ydewalle et al (1991) state, that there is no evidence suggesting that reading subtitles includes the failure to understand the sound and image at the same time. As a result, “when people watch television, the distribution of attention between different channels of information turns out to be an effortless process. Viewers seem to have developed a strategy that allows them to process these channels without problems and in which reading the subtitles occupies a major place” (d’Ydewalle & Gielen 1992, p. 425).

2.2 Subtitle length and line number

The number of lines has always been an important technicality in subtitling, which can influence the time and speed of reading (Lautenbacher 2012). The general rule is if a short subtitle fits into a single line, it should not be broken into two lines (Díaz Cintas & Remael 2007). If all information can be placed in one line, there is no need for the viewers’ eyes to travel from one line to the next. Yet, if the subtitles are placed on the center, for aesthetic reasons, some subtitling companies in cinema prefer to have two short lines of equal length rather than one very long line (Díaz Cintas & Remael 2007: 86). For them, the maximum number of characters per line means 39 or 40 characters including spaces. One-line subtitles are usually broken into two separate lines when the one-line subtitle is very long (more than 36–40). This break facilitates the understanding of syntax and/or intonation.

d’Ydewalle et al (1991) showed that the attention given to reading subtitles was significantly greater in two-liners compared with one-liners. Reading two-

line subtitles was also found to be more regular than reading one-line subtitles (d'Ydewalle & De Bruycker 2007). Regular reading of subtitles for them involves fewer subtitles skipped, relatively more time spent in subtitle, higher word fixation probability while irregular reading includes more subtitles skipped, fewer fixations, longer latencies. Caffrey (2012) measured attention allocation to one-line and two-line pop-up gloss and solo subtitles. The results reflected the same findings of d'Ydewalle et al (1991) and d'Ydewalle & De Bruycker (2007) with the exception of mean fixation duration which was higher for one-line subtitles, where fixation duration denotes the length of time, usually in milliseconds, for a fixation or group of fixations. For Caffrey (2012), subtitle line number was equal to subtitle length since the one-line subtitles were shorter than two-line subtitles. Another study on the difference of the perception and preferences for two-line and three-line subtitles showed that three-line subtitles induced greater cognitive load (Szarkowska & Gerber 2019). Similar to the previous studies (e.g., d'Ydewalle & De Bruycker 2007; d'Ydewalle et al 1991), the subtitles with three lines were lengthier than the two-line subtitles.

Before drawing any conclusion from these findings, it should be noted that in all of the mentioned studies, the two-line subtitles included more characters compared to the one-line subtitles, and line number was not the only influential variable in those studies. Therefore, it can be assumed that viewers read one-liners more rapidly since they intuitively feel there is less time available for reading the shorter subtitle. Yet, as per two-liners, the audience can take their time because they know the longer subtitle will stay for a longer time (see Szarkowska & Gerber 2019). The audience can differentiate between subtitles with various display time, which is known as 'length expectation hypothesis' (d'Ydewalle et al 1987). Furthermore, the audience may spend more time as they return from the end of the first line to the beginning of the second one, i.e., return sweeps. These interferences lead to more 'corrective eye movements' and more time given to two-line subtitles (d'Ydewalle & Gielen 1992).

The third reason is the informational value of the subtitles compared to the moving image as a significant factor in determining the processing time (Szarkowska & Gerber 2019). Short one-liners information is often redundant to the information in the picture. By contrast, the information two-liners provide is less redundant with the information provided by the visual and verbal information (d'Ydewalle & De Bruycker 2007). The example d'Ydewalle & De Bruycker (2007) give is a short one-line sentence like *Get out of here!* It is relatively easier to understand, given the verbal and visual cues (raging tone, mad face, pointing at the door, etc.). However, for longer sentences such as *get out of this town, before I call the police!*, viewers may not rely wholly on pictorial and auditory informa-

tion. The meanings of such long sentences are very dependent on the subtitle and require more attention.

It is perhaps safe to say that the mentioned studies on subtitle line number focused on subtitle length as well, and this could play an interfering role in measuring the impact of line number on reading difficulty and perception. For instance, one of the eye measures used in these studies is the number of skipped subtitles (see d'Ydewalle & De Bruycker 2007; Caffrey 2012). They reported that two-line subtitles were less often skipped compared to one-line subtitles. There is a very good probability that viewers do not skip a two-line subtitle that is more informative and longer than at least 32–36 characters, unless the viewers are tired or uninterested. On the other hand, one-liners, which are shorter than 32 characters and even redundant with the information present in the moving image, are more likely to be skipped. This may not be due to subtitle line number, but it might be caused by difference in subtitle length. It therefore appears that subtitle length is an important factor in the results of the mentioned studies on subtitle line number.

An increase in characters and subtitle length is believed to be associated with an increase in attention attributed to subtitles (d'Ydewalle & Gielen 1992; Lång et al 2013). This means that viewers need to pay more attention to subtitles when they expand in length. Caffrey (2012) showed that subtitle length is an important factor with significant effect on subtitle reading process. Shorter subtitles tended to be skipped more often compared to long subtitles. This meant that either the viewers were less sensitive to the presence of shorter subtitles, or that they read them through their peripheral vision. On the other hand, it is improbable that a long subtitle goes unnoticed. More attention given to longer subtitles could be explained by what was earlier referred to as the 'length-expectation hypothesis' (d'Ydewalle & Gielen 1992). According to this hypothesis, shorter subtitles are read more rapidly because viewers may think subtitle display time relies on the subtitle length. However, for longer subtitles, viewers are aware that the longer subtitles will stay on the screen for a longer time, and therefore they will spend more time on reading the subtitle. Perego et al (2016) showed that attention allotted to subtitles, to a great extent, relied on the degree of linguistic complexity. More complexity resulted in more time spent on reading the subtitles, and a key factor of linguistic complexity was mean sentence length, word length and word frequency. On the other hand, Moran (2012) showed that viewers read longer and more explicit subtitles faster and more effectively. For Moran, character number is not the only factor determining the reading difficulty as the author believes that longer subtitles may be read more quickly compared to shorter subtitles provided that the increase in length means that more cohesive devices have been added.

This study aims at measuring the impact of subtitle length and line number on four eye movement measures: fixation duration, fixation number, regression and subject hit count. It was hypothesized that subtitle length may increase all of the mentioned measures as markers of attention allocation. On the other hand, line number was hypothesized to have no impact on the said markers of attention allocation.

3. Method

3.1 Research design

The study uses mixed methods triangulation design by combining eye tracking (quantitative data) and retrospective interviews (qualitative data) to understand how subtitle line number and length may affect the reading process and how viewers think of these two elements. The independent variables were subtitle length and line number, and the dependent variable was attention allocation as manifested in four eye movement measures: fixation duration, fixation number, regression and subject hit count, as defined as follows:

- *Fixation duration*: This is the time of a specific fixation. Longer fixations mean more time spent on understanding an AOI and that means the more complicated it is to read (Andrychowicz-Trojanowska 2018).
- *Fixation number* or *fixation count* refers to the number of times a viewer fixates on a particular spot and it signifies one's cognition level (Andrychowicz-Trojanowska 2018).
- *Regressions* or else known as *revisits* are a transition to a point that has already been fixated on. Regressions are the second (or more than the 2nd) fixation on the previously viewed spot. In particular, they are the overall fixation number on a particular point minus 1 (i.e., minus the very first fixation) (Andrychowicz-Trojanowska 2018)
- *Subject hit count*, otherwise known as *hit ratio*, is the information (counts and/or percentage) that shows the number of participants who looked at least once at a particular area of interest. It is the number of participants that looked at a particular spot. Subject hit count also suggests which points are dismissed (Andrychowicz-Trojanowska 2018).

3.2 Participants

Forty students, studying at Ferdowsi University of Mashhad (17 males and 23 females), were invited to take part in the experiment. They were given course

credits for participating in the research. With an average age of 19.55 years ($SD=1.12$), the participants were Persian native speakers with normal or corrected-to-normal vision. None of them knew French. It was a relevant variable to control since French was the language of the stimuli (i.e., French-language film) used in this study. None of the participants had watched the film before taking part in this experiment. The data of one male and seven female participants were discarded due to the low quality. The quality refers to how properly the participants eye movements recorded. For some of the participants, the gaze cursor was way off the screen and therefore they were discarded due to low quality. Finally, the data of 32 participants were used (16 males and 16 females).

3.3 Stimuli

Two versions of a short segment (1 min 45 s) with Persian subtitles were used, which was purposefully chosen from the French-language film *A Prophet* (Jacques Audiard 2009). Version A had 9 two-line subtitles while version B had 9 one-line subtitles yet exactly with the same number of characters. In other words, the comparison between the one and two-line subtitles was done on the same text split differently. In the same segment, 18 subtitles were long in version A, and 18 were short in version B (see Table 2). The short and long subtitles were distinct from the one-line and two-line subtitles, and had the same line number. The long and short subtitles in the two versions were identically timed. The subtitles were the translations of exactly the same source content, but version B had more condensed compared to version A. There w no significant omissions in the short subtitles. All versions conformed to the established criteria for character number, synchronization, line break (for the two-subtitle subtitles) and presentation duration. Tables 1–3 show the descriptive details of subtitles used in this study.

Table 2. Characteristics of the segments used in the study

Number of two-line subtitles (version A)	9
Number of one-line subtitles (version B)	9
Number of long subtitles (Version A)	18
Number of short subtitles (Version B)	18
Segment duration	1 min 45 s

Table 1. One-line and two-line subtitles

Version A (one-line subtitles)	Version B (Two-line subtitles)
1 شنیدم شش سال حکمته. برای به جوون زمان خیلی زیادیه (Gloss: I have heard you have a 4-year sentence. It is a long time for a youth.)	شنیدم شش سال حکمته. برای به جوون زمان خیلی زیادیه
2 فکر می کنی بدون محافظت می تونی اینجا دووم بیاری؟ (Gloss: You think you can last here without a bodyguard?)	فکر می کنی بدون محافظت می تونی اینجا دووم بیاری؟
3 اون مرد میانسالی که دیروز وقتی دوش می گرفتی دیدیش (Gloss: The man you saw yesterday while taking a shower)	اون مرد میانسالی که دیروز وقتی دوش می گرفتی دیدیش
4 اون فقط ازم می خواد به کم با همدیگه حرف بزنینم (Gloss: He just wants me to talk to him)	اون فقط ازم می خواد به کم با همدیگه حرف بزنینم
5 یک بار قبلاً بهت گفتم که نباید به من نگاه کنی (Gloss: I told you once before, you should not look at me)	یک بار قبلاً بهت گفتم که نباید به من نگاه کنی
6 سعی کن بهش نزدیک بشی و بعد هم باهاش دوست بشی (Gloss: Try to get close to him and then make friends with him)	سعی کن بهش نزدیک بشی و بعد هم باهاش دوست بشی
7 تنهات نمی ذاریم و ما هم بهت کمک می کنیم انجامش بدی (Gloss: We won't leave you alone, and we will also help you do it.)	تنهات نمی ذاریم و ما هم بهت کمک می کنیم انجامش بدی
8 حالا که قاطی ماجرا شدی اگه اونو نکشی خودم می کشمت (Gloss: Now that you are a part this, if you don't kill him, I will kill)	حالا که قاطی ماجرا شدی اگه اونو نکشی خودم می کشمت
9 خیلی مراقب باش که به موقع صدات جایی در نیاد (Gloss: Be really careful not to talk anywhere)	خیلی مراقب باش که به موقع صدات جایی در نیاد

3.4 Eyetracking apparatus and eye movement measures

SMI eyetracking glasses with a sampling rate 60 Hz were used to record the eye movements. The eye movements were recorded using iView software and were analyzed by SMI BeGaze. The four eye movement measures including fixation duration, fixation number, regression and subject hit count were considered and examined. Fixation duration is the time when eyes fixate on a particular AOI. Longer fixations mean more attention allotted to an area of interest (AOI), indicating that it is more complicated to read (Just & Carpenter 1980). Fixation num-

Table 3. Long and short subtitles

A (long subtitles)	B (short subtitles)	No	A (long subtitles)	B (short subtitles)
1 همراه من بيا <i>Gloss: Come with me</i>	بيا <i>Gloss: Come</i>	10	چرا اين كار رو بكنم؟ <i>Gloss: Why should I do this?</i>	چرا؟ <i>Gloss: Why?</i>
2 چند سالتته؟ <i>Gloss: How old are you?</i> نوزده سالمه..چطور مگه؟ <i>Gloss: I am nineteen years old, how come?</i>	سنت؟ <i>Gloss: Your age?</i> نوزده..چطور؟ <i>Gloss: Nineteen, why?</i>	11	چون قراره بکشيش ولش کن <i>Gloss: Because you are supposed to kill him. Let him go.</i>	قراره بکشيش ولش کن <i>Gloss: You are supposed to kill him. Let him go</i>
3 منو نگاه نکن..بغليم رو نگاه کن منو نگاه کن <i>Gloss: Don't look at me... look at the person next to me, don't look at me</i>	بغليم رو نگاه کن منو نگاه نکن <i>Gloss: Look at the person next to me, don't look at me</i>	12	بيا نزديک تر <i>Gloss: Come closer</i>	بيا <i>Gloss: Come</i>
4 سعي مي کنم يه کاريش بکنم <i>Gloss: I will try to do something about it.</i>	يه کاريش مي کنم <i>Gloss: I will do something about it.</i>	13	بيا نزديک اون <i>Gloss: Come close to him</i>	نزديک اون <i>Gloss: Close to him</i>
5 شما از من چي مي خواهيد؟ ميخوايم ازت محافظت کنيم. <i>Gloss: What do you want from me? We want to protect you.</i>	چي مي خواهيد؟ مي خواهيم ازت محافظت کنيم <i>Gloss: What want from me? We want to protect you.</i>	14	مي دونم از عهده اش برميائي <i>Gloss: I know you can do it.</i>	مي دونم می-تونی <i>Gloss: I know you can</i>
6 عربي بلدي حرف بزني؟ آره بلدم حرف بزنم <i>Gloss: Can you speak Arabic? Yes, I can speak.</i>	عربي بلدي؟ اره <i>Gloss: Do you know Arabic? Yes</i>	15	اما يه چيزي خوب يادت باشه <i>Gloss: But remember one thing well.</i>	اما خوب يادت باشه <i>Gloss: But remember well</i>
7 باهاش آشنائي داري؟ <i>Gloss: Are you familiar with it?</i>	مي شناسيش؟ <i>Gloss: Do you know him?</i>	16	خيلي خب برو ديگه <i>Gloss: Very well, go</i>	خب ديگه <i>Gloss: Well</i>
8 بگو اون چي مي خواد ازت؟ <i>Gloss: What does he want from you?</i>	چي مي خواد؟ <i>Gloss: What does he want?</i>	17	حالا فهميدي؟ <i>Gloss: Now, did you get it?</i>	فهميدي؟ <i>Gloss: Did you get it?</i>

A (long subtitles)	B (short subtitles)	No	A (long subtitles)	B (short subtitles)
9 ازت مي خوام بازم بري پيشش <i>Gloss: I want you to go to him again.</i>	برو پيشش <i>Gloss: Go to him</i>	18	من نمي تونم كسي رو بكشم <i>Gloss: I can't kill anybody</i>	نمي تونم آدم بكشم <i>Gloss: Can't kill a person</i>

ber or fixation count refers to the number of times a viewer fixates on a particular AOI, and this shows cognition effort (Andrychowicz-Trojanowska 2018). Regressions or also known as revisits are transitions to a point that has already been fixated on. Regressions happen when a viewer makes a saccade in the opposite direction to the direction of reading, and fixates on a word that has already been fixated on. In particular, they are the overall fixation number on a particular point minus one, i.e., minus the very first fixation (Andrychowicz-Trojanowska 2018). Subject hit count, otherwise known as hit ratio, is the information (number or percentage) that shows the number of participants who looked at least once at a particular AOI. Subject hit count also suggests which areas are skipped (Andrychowicz-Trojanowska 2018).

The participants had a 60-cm distance from a 15” monitor in a sufficiently lighted room. After performing a three-point calibration to validate the correct detection of eye movements, the participants’ eye movements were recorded by the eye tracker and iView software. During the recording phase, an eyetracking expert supervised the entire data collection. The AOIs were defined, and the eye-tracking measures were extracted by using BeGaze software and through semantic gaze mapping which required for eye tracking glasses. Finally, a few minutes after the eyetracking phase, the interviews with the participants were run and recorded by an audio recorder for analysis. In the interviews, the participants were first asked if they had noticed any difference between the two versions. In other words, we were curious if they had even noticed the difference in length and line number, which they did. Then, we asked for their opinion about the versions and which one they prefer.

3.5 Research variables

There were two sets of dependent and independent variables in this study. The independent variables were the subtitles line number and length, and on the other hand, the dependent variables were four eye tracking measures (fixation duration, fixation number, regression and subject hit count) and interview responses of the

participants. The comprehension test served more as an inclusion criteria, thus the scores of the comprehension test were not assumed as the research variable.

3.6 Procedure

Before the experiment, the study procedures were explained to them, yet the exact purpose was not revealed. The eyetracking was not over-explained since it could make them too conscious of their eye movements (Pernice & Nielsen 2009). Each participant signed a written consent to take part in the study. The experiment took place at the Motor Behavior Lab of the Faculty of Physical Education at Ferdowsi University of Mashhad. After the experiment, five multiple-choice comprehension questions were given to the participants to answer. The answers to the comprehension test were meant to show if the participants had understood the subtitles content. The questions only addressed the subtitles (not the information solely given by the visual). Those who answered all of the 5 questions correctly were included in the study.

The participants were given two minutes while wearing the eyetracking glass in order to become accustomed to the condition of the experiment. After the main phase of the experiment and the comprehension test, All of the participants were invited to participate in a retrospective semi-structured interview to share their views on the difficulties and challenges they faced while reading the subtitles.

4. Results

4.1 Eyetracking experiment

The results of the eyetracking experiment showed that there was a significant difference between attention allocation to one-line and two-line subtitles with regard to two of the eye movement measures. Fixation duration and fixation number were significantly higher when viewing one-line subtitles, suggesting more attention allotted while reading one-line subtitles compared with two-line subtitles of equal length. On the other hand, two of the measures (fixation duration and fixation number) showed that the lengthier subtitles received more attention compared to the shorter subtitles with the same line number. This suggests more attention allocation while reading subtitles greater in length—see Table 4. A paired sample *t*-test was used on IBM SPSS for every eyetracking measure.

4.1.1 Subtitle line number

Table 4 shows the eyetracking measures for the one-line and two-line subtitles. The results showed a significant difference ($p=0.035$, $t(8)=2.5$) with a large effect size ($Es=0.847$) between attention allocation to one-line ($M=60,830$ ms, $SD=10,688$ ms) and two-line subtitles ($M=55,517$ ms, $SD=8,499$ ms). The total fixation duration for reading one-line subtitles was significantly longer compared to the fixation duration of two-line subtitles. The number of fixations also showed that the viewers gazed at the one-line subtitles more frequently. The mean fixation number for the one-line subtitles was 296.8 ($SD=39.8$) while the mean fixation number for the two-line subtitles was 287.7 ($SD=42.2$). According to the paired t-test results, the difference between fixation number for one-line and two-line subtitles was significant ($p=0.026$, $t(31)=2.7$) with a large effect size.

The results showed that there was no significant difference between the regression number of one-line ($M=10.8$, $SD=4.9$) and two-line ($M=10.3$, $SD=2.8$) subtitles ($p=0.6$, $t(8)=0.4$). The regression number for the one-line subtitles was higher compared to the two-line subtitles, yet the difference was not statistically significant. There was no difference between subject hit count in reading one-line ($M=99.6\%$, $SD=1.34\%$) and two-line subtitles ($M=99.6\%$, $SD=1.34\%$) ($p=1$, $t(8)=0.00$). This means that an average of 0.4% skipped the subtitles of both versions.

Table 4. Eyetracking measures for the one-line and two-line subtitles

Eye movement measure	Lines	<i>SD</i>	<i>M</i>	<i>T</i>	<i>Df</i>	<i>p</i>	<i>Es</i>
Total fixation durations (ms)	1	10,688	60,830	2.5	8	0.035	0.847
	2	8,499	55,517				
Fixation number	1	39.8	296.8	2.7	8	0.026	0.911
	2	42.2	287.7				
Regression	1	4.9	10.8	0.4	8	0.6	0.125
	2	2.8	10.3				
Subject hit count	1	1	99.6	0.000	8	1	0.000
	2	1	99.6				

4.1.2 Subtitle length

Table 5 shows the eyetracking measures for the short and long subtitles. The results of the t-test showed that there was a significant difference ($p=0.012$, $t(17)=2.7$) with a large effect size ($Es=0.659$) in attention allocation to longer ($M=30,971.51$ ms, $SD=11,974$ ms) and shorter ($M=25,728$ ms, $SD=9,524.16$ ms)

subtitles. Regardless of line number, the total fixation duration for reading shorter subtitles was significantly lower compared to the total fixation duration for reading longer subtitles.

The mean fixation number for the longer subtitles was 151.6 ($SD=63$) while the mean fixation number of shorter subtitles was 101 ($SD=58.9$). The paired t -test results showed that the difference between fixation number for longer and shorter subtitles was significant ($p < 0.01$, $t(17)=6.3$) with the effect size of 1.4. Therefore, the participants more frequently gazed at the longer subtitles, which shows the more attention given to them.

Table 5. Eyetracking measures for short and long subtitles

Eye movement measure	Lines	SD	M	T	Df	p	Es
Total fixation duration (ms)	Short	9,524	25,728	2.7	17	0.012	0.659
	Long	11,974	30,971				
Fixation number	Short	58.9	101	6.3	17	<0.001	1.4
	Long	63	151.6				
Regression	Short	5.8	6.4	0.268	17	0.792	0.068
	Long	8.1	6.7				
Subject hit count	Short	9.05	95.2	1.5	17	0.133	0.379
	Long	3.1	98.5				

The results showed that there was no significant difference between the longer ($M=6.7$, $SD=8.1$) and shorter ($M=6.4$, $SD=5.8$) subtitles in terms of regression ($p=0.792$, $t(17)=0.268$). However, the mean regression for the shorter subtitles was slightly lower compared to that of the longer subtitles. Table 5 shows the regression mean for the shorter and longer subtitles as well as the paired t -test results. The number of participants who looked at least once at the long subtitles ($M=98.5\%$, $SD=3.1\%$) was larger than the number of those who viewed the short subtitles ($M=95.2\%$, $SD=9.05\%$). However, no significant difference was observed between subject hit count in short and long subtitles ($p=0.133$, $t(17)=1.5$).

4.2 Semi-structured interviews

4.2.1 Subtitle line number

The majority (25 participants, 78.1%) of the participants favored two-line over one-line subtitles. Some participants believed that it was very likely to read the two lines at the same time while reading two-line subtitles. One of the participants stated that his 'eyes can read both lines at the same time' (participant 18). Some

also believed that reading one-line subtitles was time-consuming. For instance, participant 11 stated that ‘reading the words of a whole sentence in a row is very hard, but one could keep an eye on the second line as they are reading the first. This proclaimed parafoveal reading of the second line may happen in the participants’ peripheral vision. One participant believed that since the lines are shorter in two-line subtitles, such subtitles are easier to read: ‘I like two-line subtitles more because it has shorter lines, and they can be understood more easily in one glance. I can read both lines at the same time’ (participant 15). Participant 11 stated that he preferred the two-line subtitles simply because he was used to reading such subtitles while watching foreign subtitled films: ‘I am more used to reading two-line subtitles. They are faster to read’ (participant 2). Some participants stated that they used the time between reading the two lines for more concentration: ‘when I finish the first line, I can stop for a short while, and it gives me an opportunity to concentrate’ (participant 19).

On the other hand, a few participants also favored one-line subtitles (7 participants, 21.9%). They thought the time between reading the two lines distracted them and made them forget the content of the first line: ‘I like one-line subtitles better because there is a time between reading the first and second line, which makes me forget the content of the first line’ (participant 9). The major reason, however, was the confusion caused by reading the words of the bottom line while reading the top line and vice versa: ‘one-line subtitles are better because I may confuse the words on the top and bottom line while reading two-line subtitles. I also read them faster’ (participant 10). ‘One-line subtitles are better because you don’t confuse the two lines. You easily read the words one after another’ (participant 13). They believed reading one-line subtitles needed easier mental scheme. They only had to move their eye linearly, which made the one-line subtitles ‘easier to follow’ (participant 24).

4.2.2 Subtitle line length

28 participants (87.5%) preferred the shorter sentence with the exception of a few viewers (22.3%) who were interested in getting maximum information. This is in agreement with the results of our eyetracking experiment where fixation duration and fixation number were higher for longer subtitles, suggesting greater cognitive load imposed on the viewers. Some also preferred subtitles that are neither long nor short: ‘I like the subtitle to be short, but not too short because I need to get adequate information’ (participant 11).

5. Discussion

This study attempted to investigate the effect of subtitle length and line number on viewer's allocation of visual attention through measuring four eye movement measures: fixation duration, fixation number, regression and subject hit count. According to the research hypotheses, subtitle length may increase all of the mentioned measures. Yet, line number was hypothesized to have no effect on the mentioned eye measures. The findings showed that for line number, the hypothesis was partly confirmed. Furthermore, the total fixation duration for reading one-line subtitles was significantly longer compared to the fixation duration of two-line subtitles. The number of fixations also showed that the viewers gazed at the one-line subtitles more frequently. The mean fixation number for the one-line subtitles was 296.8 ($SD=39.8$) while the mean fixation number for the two-line subtitles was 287.7 ($SD=42.2$). According to the paired t-test results, the difference between fixation number for one-line and two-line subtitles was significant ($p=0.026$, $t(31)=2.7$) with a large effect size.

The results showed that there was no significant difference between the regression number of one-line ($M=10.8$, $SD=4.9$) and two-line ($M=10.3$, $SD=2.8$) subtitles ($p=0.6$, $t(8)=0.4$). The regression number for the one-line subtitles was higher compared to the two-line subtitles, yet the difference was not statistically significant. There was no difference between subject hit count in reading one-line ($M=99.6\%$, $SD=1.34\%$) and two-line subtitles ($M=99.6\%$, $SD=1.34\%$) ($p=1$, $t(8)=0.00$). This means that an average of 0.4% skipped the subtitles of both versions. As for the subtitle length, the mentioned hypothesis held true (except for regression). There was a significant difference in attention allocation to lengthier and shorter subtitles. Regardless of line number, the total fixation duration for reading shorter subtitles was significantly lower compared to the total fixation duration for reading longer subtitles. The results also showed that the difference between fixation number for longer and shorter subtitles was significant. Therefore, the participants more frequently gazed at the longer subtitles, which shows the more attention given to them. However, no significant difference was observed between subject hit count in short and long subtitles.

The finding that more attention is allotted to one-line subtitles in this study is in conflict with the findings of the majority of previous studies on the subject (d'Ydewalle et al 1991; Praet et al 1990; d'Ydewalle & De Bruycker 2007; Caffrey 2012; Szarkowska & Gerber 2019), which found that the attention allocated to subtitles with a higher number of lines was significantly greater compared with subtitles with fewer lines. They assigned this finding to the length expectation effect, the subtitle informational value and the presence of lateral interference between the two lines (d'Ydewalle & De Bruycker 2007, p. 674). They believe that viewers

prefer to read one-line subtitles since they can go through the reading faster as the viewers intuitively think they have less time to read the subtitle. However, as per two-line subtitles, viewers take their time because they assume the subtitle will remain on the screen for a longer period of time. d'Ydewalle et al (1987) provided evidence that subtitle viewers were able to distinguish between subtitles with different display time which they called this length expectation hypothesis. The second reason refers to the informational value of the subtitle in comparison with the film's visual information as an important factor in determining the subtitle processing time. Short one-liners information is often redundant to the information in the picture. On the contrary, two-line subtitles provide more information that is not present in the film image and is less redundant with the visual and verbal information (d'Ydewalle & De Bruycker 2007). The meanings of such long sentences considerably rely on the subtitle information, and this ends in more attention allocated to them. Furthermore, a two-line subtitle will lead to more lateral interference and it is possible that the reading of two-line subtitles is more difficult to initiate with the first word on the first line (d'Ydewalle & De Bruycker 2007). In addition, viewers may spend more time as they need to make return sweeps from the end of the first line to the beginning of the second. These interferences from the two lines lead to more 'corrective eye movements' and therefore more time allotted to two-line subtitles (d'Ydewalle & Gielen 1992). The opinion of some of the viewers in our study also acknowledged that the existence of two lines confused them. They also stated that there is a time slot between finishing the first line and starting the second one, which made them forget the content of the first line. That is why some of the participants stated that following one-line subtitles was much easier than two-line subtitles. Although the third reason could be a reasonable argument, the first two reasons may not hold true when one-line and two-line subtitles have equal length. One has to be careful that length expectation effect and information value difference may rely on the subtitle length, not the subtitle line number. Therefore, it could be argued that the length of the subtitle could affect the eye movement measures regardless of number of lines. In other words, when subtitles are different both in length and line number, it is not reliable to assign differences in eye movement measures to either of the two variables, and instead, research should address each variable separately. That was why the impact of length on subtitle reading was measured separately in the current study.

The results of reading short and long subtitles were in line with the widespread tendency to use reduction and condensation or omission in making subtitles because of the little time viewers have to read the subtitles and watch the moving image (Moran 2012). Although Abdi & Khoshsaligheh (2018) showed that too brief subtitles which relied on the redundancy of information in the visual content were dismissed by the viewers who complained about a feeling that some-

thing is missing in the abridged subtitles. Szarkowska & Bogucka (2019) also found that more text condensation leads to lower comprehension of subtitles. It is believed that increase in characters and subtitle length concurs with a rise in attention to subtitles which means that the viewers need to give more attention to subtitles when they expand in length (d'Ydewalle & Gielen 1992). According to the results of the eyetracking experiment, there was a significant difference between attention allocation to longer and shorter subtitles. The mean fixation duration and fixation number for reading shorter subtitles were significantly lower compared to the longer subtitles. This indicated significantly more attention allocation to the subtitles with longer sentences. The results of the retrospective interviews showed that the majority preferred subtitles with shorter sentence because they had more time to attend the moving image. This is in line with the previous studies (d'Ydewalle & Gielen 1992; Caffrey 2012) that found subtitle length is an important factor with a significant impact on subtitle reading. However, in the previous studies, longer subtitles meant subtitles with two lines, and shorter ones had one line (Caffrey 2012; d'Ydewalle & Gielen 1992). This was also true about d'Ydewalle & De Bruycker's (2007) research. As previously mentioned, more attention paid to longer subtitles could be explained by "length-expectation hypothesis" (d'Ydewalle & Gielen 1992). The hypothesis holds that viewers tend to read shorter subtitles faster because they think they have less time to read the subtitle. However, for longer subtitles, viewers know the subtitle will remain on the screen for a longer period of time, and they thus will be able to spend more time on reading the subtitle. Attention allotted to subtitles largely depends on the degree of complexity. More complexity results in more time spent on reading the subtitles. One of the factors of linguistic complexity is average sentence length (Perego et al 2016).

6. Conclusion

This study provided further examination of visual attention allocation to subtitles in terms of line number and length. The findings suggested more attention allotted to reading of one-line and shorter subtitles. The responses to the retrospective interviews also indicated that the participants favored short over longer subtitle. The majority of the participants also favored two-line subtitles. The findings of this study may benefit subtitling trainers and practitioners by keeping in mind how subtitle line number and length may affect the reading of subtitles. However, the results reported in this study should be considered in the light of the following limitations. The first limitation concerns the eyetracking device used in this study. The researcher had access to eyetracking glasses with the speed of 60 Hz, and it

was not possible to use a device with greater precision although the same device (or devices with more tracking speed) has been successfully used by a number of renowned studies (see, for instance, Moran 2012). Due to the cost of using the eyetracker, we used 32 participants. A more comprehensive research could use a greater number of participants to increase the generalizability of the findings. For the same reason, the video excerpts did not exceed 2 minutes. However, longer scenes could be analyzed in the future studies. Another limitation in this study was the lack of prior research on Persian subtitles using eye tracking, leaving us with scant background information in the context of Iran.

For triangulation purposes, only retrospective interviews were used in data elicitation for understanding the viewers' cognition and attention allocation, and other instruments such as EEG, ERP, etc. were not used in this study. The study only focused on crime/drama and comedy genre, and other genres were not a focus of this study. The eye metrics used in this study were delimited to fixation duration, fixation number, first fixation duration, subject hit count, regressions (quantitative) and heatmaps (qualitative). A future study can use other eye metrics including pupil dilation, dwell time, etc. Given the split in two-line subtitles, future research could measure how this disruption can affect the reading process of viewers.

References

- Abdi, Zahra, and Masood Khoshshalgheh. 2018. "Applying Multimodal Transcription to Persian Subtitling." *Studies About Languages* 32: 21–38. <https://doi.org/10.5755/J01.sal.o.32.19212>
- Andrychowicz-Trojanowska, Agnieszka. 2018. "Basic Terminology of Eyetracking Research." *Applied Linguistics Papers* 2: 123–132. <https://doi.org/10.32612/uw.25449354.2018.2.pp.123-132>
- Caffrey, Colm. 2012. "Using an Eye-tracking Tool to Measure the Effects of Experimental Subtitling Procedures on Viewer Perception of Subtitled AV Content". In *Eye Tracking in Audiovisual Translation*. Edited by Elisa Perego, 223–258. Rome: Arcane. <https://doi.org/10.13140/2.1.4680.5446>
- Caffrey, Colm. 2009. Relevant Abuse? Investigating the Effects of an Abusive Subtitling Procedure on the Perception of TV Anime using Eye Tracker and Questionnaire. PhD thesis, Dublin City University.
- d'Ydewalle, Géry, and Ingrid Gielen. 1992. "Attention Allocation with Overlapping Sound, Image, and Text." In *Eye Movements and Visual Cognition*. Edited by Keith Rayner, 415–427. New York: Springer. https://doi.org/10.1007/978-1-4612-2852-3_25
- d'Ydewalle, Géry, Caroline Praet, Karl Verfaillie, and Johan Van Rensbergen. 1991. "Watching Subtitled Television: Automatic Reading Behavior." *Communication Research* 18: 650–666. <https://doi.org/10.1177/009365091018005005>

- d'Ydewalle, Géry, Joris. V. Rensbergen, and Johan Van Pollet. 1987. "Reading a Message When the Same Message is Available Auditorily in Another Language: The Case of Subtitling." In *Eye Movements: From Physiology to Cognition*. Edited by O'Regan, J. K. and Levy-Schoen, A., 313–321. Amsterdam: Elsevier.
<https://doi.org/10.1016/B978-0-444-70113-8.50047-3>
- d'Ydewalle, Géry, and Wim De Bruycker. 2007. "Eye Movements of Children and Adults while Reading Television Subtitles." *European Psychologist* 12(3): 196–205.
<https://doi.org/10.1027/1016-9040.12.3.196>
- Díaz Cintas, Jorge. 2013. "Subtitling: Theory, Practice and Research." In *The Routledge Handbook of Translation Studies*. Edited by Carmen Millán Varela and Francesca Bartrina Martí, 285–299. London: Routledge.
<https://doi.org/10.4324/9780203102893.ch20>
- Díaz Cintas, Jorge, and Aline Remael. 2007. *Audiovisual Translation: Subtitling*. Manchester: St. Jerome Publishing.
- Doherty, Stephen. 2016. "The Impact of Translation Technologies on the Process and Product of Translation." *International Journal of Communication* 10: 947–969.
- Duchowski, Andrew. 2017. *Eye Tracking Methodology*. London: Springer.
<https://doi.org/10.1007/978-3-319-57883-5>
- Elisa Perego, Fabio Del Missier, Marco Porta, and Mauro Mosconi. 2010. "The Cognitive Effectiveness of Subtitle Processing." *Media Psychology* 133: 243–272.
<https://doi.org/10.1080/15213269.2010.502873>
- Gerber Morón, Olivia, and Agnieszka Szarkowska. 2018. "Line Breaks in Subtitling: An Eye Tracking Study on Viewer Preferences." *Journal of Eye Movement Research* 113: 1–22.
<https://doi.org/10.16910/jemr.11.3.2>
- Ghia, Elisa. 2012. "The Impact of Translation Strategies on Subtitle Reading." In *Eyetracking in Audiovisual Translation*. Edited by Elisa Perego, 157–182. Rome: Arcane.
<https://doi.org/10.13140/2.1.4680.5446>
- Gottlieb, Henry. 2012. "Subtitles: Readable Dialogue?" In *Eye Tracking in Audiovisual Translation*. Edited by Elisa Perego, 83–104. Rome: Arcane.
<https://doi.org/10.13140/2.1.4680.5446>
- Just, Marcel A., and Patricia A. Carpenter. 1980. "A Theory of Reading: From Eye Fixations to Comprehension." *Psychological Review* 87(4): 329–354.
<https://doi.org/10.1037/0033-295X.87.4.329>
- Krejtz, Izabela, Agnieszka Szarkowska, and Krzysztof Krejtz. 2013. "The Effects of Shot Changes on Eye Movements in Subtitling." *Journal of Eye Movement Research* 6(5:3): 1–12. <https://doi.org/10.16910/jemr.6.5.3>
- Krejtz, Izabela, Agnieszka Szarkowska, and Maria Łożyńska. 2016. "Reading function and content words in subtitled videos." *The Journal of Deaf Studies and Deaf Education* 21(2): 222–232. <https://doi.org/10.1093/deaf/env061>
- Lång, Juha, Jukka Mäkisalo, Tersia Gowases, and Sami Pietinen. 2013. "Using Eye Tracking to Study the Effect of Badly Synchronized Subtitles on the Gaze Paths of Television Viewers." *New Voices in Translation Studies* 10: 72–86. Accessed on January 20, 2020, <https://www.iatis.org/images/stories/publications/new-voices/Issue10-2013/articles/article-long-2013b.pdf>
- Lautenbacher, Olli Philippe. 2012. "From Still Pictures to Moving Pictures: Eye Tracking Text and Image." In *Eye Tracking in Audiovisual Translation*. Edited by Elisa Perego, 135–156. Rome: Arcane. <https://doi.org/10.13140/2.1.4680.5446>

- Moran, Siobhan. 2012. "The Effect of Linguistic Variation on Subtitle Reading". In *Eye Tracking in Audiovisual Translation*. Edited by Elisa Perego, 183–222. Rome: Arcane. <https://doi.org/10.13140/2.1.4680.5446>
- Mosconi, Mauro, and Marco Porta. 2012. "Accessibility and Usability in the Context of Human–Computer Interaction." In *Eye Tracking in Audiovisual Translation*. Edited by Elisa Perego, 105–134. Rome: Arcane. <https://doi.org/10.13140/2.1.4680.5446>
- Muñoz Lahoz, Carmen. 2017. "The Role of Age and Proficiency in Subtitle Reading. An Eyetracking Study." *System* 67: 77–86. <https://doi.org/10.1016/j.system.2017.04.015>
- Perego, Elisa, ed. 2012. *Eye Tracking in Audiovisual Translation*. Rome: Arcane. <https://doi.org/10.13140/2.1.4680.5446>
- Perego, Elisa, Monica Laskowska, Anna Matamala Ripoll, Aline Remael, Isabelle S. Robert, Agnieszka Szarkowska, Anna Vilaro Soler, and Sara Bottiroli. 2016. "Is Subtitling Equally Effective Everywhere? A First Cross-national Study on the Reception of Interlingually Subtitled Messages." *Empirical Approaches to Audiovisual Translation: Special issue of Across Languages and Cultures* 172: 205–229. <https://doi.org/10.1556/084.2016.17.2.4>
- Perego, Elisa. 2008. "Subtitles and Line-Breaks: Towards Improved Readability." In *Between Text and Image*. Edited by Delia Chiaro, Christine Heiss, and Chiara Bucaria, 211–226. Amsterdam: Benjamins. <https://doi.org/10.1075/btl.78.21per>
- Pernice, Kara and Jakob Nielsen. 2009. *How to Conduct Eyetracking Studies*. Indianapolis: New Riders Publishing.
- Praet, Caroline, Karl Verfaillie, Peter De Graef, Johan Van Rensbergen, and Géry D'Ydewalle. 1990. "A One Line Text is Not Half a Two Line Text." In *From Eye to Mind: Information Acquisition in Perception, Search and Reading* edited by Rudolf Groner, Géry D'Ydewalle, and Ruth Parham, 205–213. Amsterdam: Elsevier.
- Rayner, Keith. 1998. "Eye Movements in Reading and Information Processing: 20 years of Research." *Psychological Bulletin* 124(3): 372–422. <https://doi.org/10.1037/0033-2909.124.3.372>
- Szarkowska, Agnieszka, and Lidia Bogucka. (2019). "Six-second Rule Revisited: An Eyetracking Study on the Impact of Speech Rate and Language Proficiency on Subtitle Reading." *Translation, Cognition & Behavior* 2(1): 101–124. <https://doi.org/10.1075/tcb.00022.sza>
- Szarkowska, Agnieszka, and Olivia Gerber Morón. 2019. "Two or Three Lines: A Mixed-methods Study on Subtitle Processing and Preferences." *Perspectives: Studies in Translation Theory and Practice* 27(1): 144–164. <https://doi.org/10.1080/0907676X.2018.1520267>
- Szarkowska, Agnieszka, Izabela Krejtz, Krzysztof Krejtz, and Andrew Duchowski. 2013. "Harnessing the Potential of Eyetracking for Media Accessibility." In *Translation Studies and Eyetracking Analysis*. Edited by Sambor Gruzca, Monika Pluzyczka, and Justyna Zajac, 153–183. Frankfurt: Peter Lang.

Address for correspondence

Saber Zahedi
Department of English
Ferdowsi University of Mashhad
Mashhad
Iran
zahedi.saber@gmail.com

Biographical notes

Saber Zahedi has a PhD in Translation Studies and is a part-time lecturer in Ferdowsi University of Mashhad, teaching translation courses in the MA and BA program and supervising MA dissertations. He is also a certified translator to IRI Judiciary. His research interests include translation directionality, AVT, and eyetracking in translation research.

 <https://orcid.org/0000-0002-3302-3685>

Masood Khoshsaligheh is a Professor of Translation Studies and Vice Dean for Research at the Faculty of Letters and Humanities at Ferdowsi University of Mashhad. He teaches on the MA English Translation, and the PhD Translation Studies at the Department of English. He mainly lecture on theoretical aspects of audiovisual translation, translator education, and research methodology in translation studies. I also supervise Master and PhD theses on audiovisual translation. He also servse on the editorial board of several peer-reviewed international journals. His research interests include audiovisual translation, translator education, and intercultural communication.

 <https://orcid.org/0000-0002-6508-1986>

Publication history

Date received: 20 January 2021

Date accepted: 28 July 2021