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AN EMPIRICAL TAKE ON THE DUBBING VS. SUBTITLING DEBATE
An Eye Movement Study

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Abstract – The empirical study of the processing of dubbed and subtitled audiovisual content still lacks attention in academic circles and the discussion commonly draws on anecdotal and speculative assumptions. To address this issue, we carried out two studies to explore the cognitive, evaluative and visual reception of dubbed and subtitled content using behavioural data and eye tracking, and different audiovisual materials with varying levels of complexity. The results support the value of both dubbing and subtitling as effective translation methods. Our findings suggest that both techniques are cognitively effective and positively received and assessed by viewers. However, the eye-tracking data suggest that in spite of these results, the processing of complex subtitled films might require more effort from viewers and require them to accelerate their reading process. Apart from highlighting the relevance of complexity, the experimental design also hints at the possible influence of stimulus length as a factor affecting performance.

Keywords: eye tracking; complexity; subtitling; dubbing; reception.

1. Introduction

Films are multimodal ensembles, where the meaning is conveyed through the combination of several integrated semiotic modes; these include spoken and written words, sound, music, visual images, and so on (Taylor 2012, 2016). The semiotic resources used in a film "work together to create the impression that we as viewers are meant to perceive" (Taylor 2012, p. 18). These "impressions" are imposed on viewers thanks to a wide range of techniques that film makers mix and match (Bazin 1967), often overlooking the fact that viewers may form their own interpretation of what they see based on their background experience and understanding of events.

Film viewing entails the acquisition of information displayed on screen by the use of scanning eye movements (Goldstein *et al.* 2007). Studies on the scanpath of moving images show that observers watching a film tend to look in the same place (the centre of the scene) with slight age and gender related differences, and that the observed area is generally less than 12% of the movie screen (Goldstein *et al.* 2007; Tosi *et al.* 1997).

When films are translated for distribution in foreign markets, they preserve their original multimodal structure only when they are dubbed and the original soundtrack is completely replaced by a new synchronized one. When subtitling is used, a transitory text on screen is added to the original soundtrack and the moving images on screen so the viewer is confronted with a richer multimodal ensemble and an additional reading task. The addition of subtitles changes the way a film is scanned (Kruger *et al.* 2014, 2015): the newly added written information on the screen demands part of the visual attention that viewers allocate to the audiovisual product. However, it is not yet clear to what extent adding subtitles influences the way a film is perceived, i.e., the way it is understood, remembered and appreciated by the

viewer. For some time, it has been speculated that adding subtitles to an audiovisual product makes the processing of the product more challenging and prevents viewers from enjoying the viewing experience to the full (Marleau 1982). According to this stance, dubbing would not impose an extra cognitive load and it would be easier to follow and enjoy. The recent empirical literature, however, partly refuted these assumptions, even though in some cases a negative effect of subtitles on perceived enjoyment has emerged (Orrego-Carmona 2015).[1] Some studies contrasting dubbing and subtitling demonstrated that watching a subtitled film does not affect its appreciation (Perego *et al.* 2015, 2016; Wissmath *et al.* 2009), and most studies on subtitling seem to confirm that it does not negatively influence the way a film is processed cognitively, at least when the film is moderately complex (e.g. d'Ydewalle, De Bruycker 2007; Hinkin *et al.* 2014; Kruger *et al.* 2014; Orrego-Carmona 2015; Perego *et al.* 2010; Wissmath *et al.* 2009).

At present, most empirical research has been conducted without simultaneously considering dubbing and subtitling, and without focusing on the nature of the audiovisual (AV) product used in the experiments. However, we know that the structural features of AV messages, such as pace, redundancy and relative importance, may have a strong impact on viewers and may determine the type and effectiveness of viewers' processing strategies (Grimes 1991; Lang *et al.* 1993, 2000). In fact, it has been demonstrated recently that when film complexity increases, the cognitive effectiveness of subtitle processing decreases (Perego *et al.* 2016). Based on this, it is reasonable to assume that the complexity of the presented AV material could affect its visual processing, too. However, this has not yet been researched, and this gap in the empirical literature on AVT serves as the motivation for the studies reported in this article. More specifically, our aim is fourfold. First, we replicate earlier research and assess the cognitive and evaluative differences in the reception of subtitled and dubbed products (Perego *et al.* 2015; Wissmath *et al.* 2009), even when they are complex (Perego *et al.* 2016). Second, we assess whether the image area in a subtitled and in a dubbed film are scanned in a different way. Third, we assess whether the allocation of visual attention changes if the AV product in question is particularly complex. Fourth, we assess whether there is any correlation between the cognitive and evaluative performance of the viewers and their film scanning behaviour. To do so, we carried out two studies and used both behavioural and eye-tracking measures.

The study of dubbed-content viewing using eye tracking is a highly innovative field. This study constitutes one of the first initiatives to test empirically the differences in the reception of subtitled and dubbed products using eye-tracking measurements. Although recently some studies have been conducted with re-speaking and audio description (Chmiel, Mazur 2016; Romero-Fresco 2015), most eye-tracking studies dealing with translated content have focused mostly on subtitled products (e.g. d'Ydewalle *et al.* 1991; d'Ydewalle, De Bruycker 2007; Hinkin *et al.* 2014; Kruger *et al.* 2014, 2015; Orrego-Carmona 2015; Perego 2012; Perego *et al.* 2010; Szarkowska *et al.* 2015). And up to now, studies exploring the visual reception of subtitled content have mostly analysed the distribution of attention between the area at the bottom of the screen where the subtitles are shown, and the rest of the screen, where the images are displayed.

[1] In particular, in the study of Orrego-Carmona (2015) the addition of subtitles seemed to influence the amount of effort viewers think they require to understand the film, and it negatively affects their perception of enjoyment.

2. The studies

To accomplish our aims, we carried out two studies. Study 1 and Study 2 were designed to replicate earlier research (Perego *et al.* 2015) and assess the cognitive and evaluative differences in the reception of subtitled and dubbed products, to shed light on the visual processing of these products, and to assess whether there is any correlation between the cognitive and the evaluative performance of the viewers and their film scanning behaviour. In the case of Study 1, the goal was to test a moderately complex product. On the contrary, Study 2 explored the reception of a subtitled and dubbed product under boundary conditions, i.e., when the product is complex. Furthermore, Study 2 was designed to assess whether the complexity of the AV product affects viewer's scanning strategies and, if so, to see if this is somehow related to their performance.

As mentioned in the Introduction, while watching a subtitled product, viewers' attention is necessarily divided between subtitles and image. This should not affect their performance and their appreciation of the film when the film is moderately complex, but it could affect them if complexity increases. If this is true, we expect that in our experiments the comprehension and appreciation of subtitled material will be poor in Study 2, and that in terms of scanning behaviour viewers in Study 2 will inspect the subtitles for a longer period of time than the rest of the screen. As a consequence, they will lose the pleasure of film viewing (as is speculated in the non-empirical literature, e.g. Marleau 1982) and the ability to focus and remember the visuals, which are characterizing features of films. In other words, we expect that the cognitive and visual processing of complex AV material will be hindered or slowed down by the need to interleave subtitle reading and visual scene encoding, and integrate complex information coming from several sources during the comprehension process. On the contrary, when AVT material is simpler, the encoding and integration processes can demand less effort and be performed effectively. Additionally, this might transpire also at the level of film scanning.

3. Methodology

Study 1 and Study 2 were conducted following the same methodology but with different video material for each study. In this section, we describe the methodological tools and the indicators of complexity that we employed for both studies. Details about the participants and the video excerpts are described separately when dealing with each Study.

3.1. Materials

3.1.1. Film complexity indexes

To set up the two Studies, we selected two film excerpts differing in complexity. We adopted an interdisciplinary approach and considered three major dimensions to define and measure complexity: structural-informative, linguistic, and narrative complexity. To do so, we relied on literature on media communication (Lang *et al.* 1993, 2000), film language (Pavesi 2005), language complexity (Li 2000; Szmrecsányi 2004), and film narrative (Barsam 2007; Monaco 2009; Murphy 2007). In particular, structural-informative complexity refers to the film's pace as well as the amount of new information added each time a cut occurs and the overall number of subtitles included in the excerpt. Linguistic complexity refers to the total word number in the target subtitles and in the dubbed version, as well as the average sentence length in the

target subtitles and in the dubbed version. Narrative complexity refers to the linearity (vs. intricacy) of the story line and the number of characters, places and story lines involved. Details of the complexity indexes of both films are shown in Table 1 below.

Capitalizing on our previous research (Perego *et al.* 2016), we used the same AV material, i.e., an excerpt from the Lebanese comedy *Caramel* (*Sukkar banat*, 2007, N. Labaki) for Study 1, and an excerpt from the BBC series *Sherlock* (Series 1, Episode 1) for Study 2. For the sake of the eye-tracking measurements, we reduced the length of the two excerpts from around 25 minutes to around 10 minutes each (Saldanha, O'Brien 2013), adapting the questionnaires accordingly.[2]

	Caramel (Study 1)	**Sherlock** (Study 2)
Length of the excerpt	11''	12''
Structural-informative complexity		
Pace	10.54 (medium)	15.67 (fast)
New info introduced (# cuts)	17 (1.55)	21 (1.75)
Number of subtitles	90 (8.18)	194 (16.16)
One-liners	23 (2.09)	79 (6.58)
Linguistic complexity		
Total word count Sub/Dub	567/949 (51.55/86.27)	1446/1326 (120.5/110.5)
Types (distinct words) Sub/Dub	309/427 (28.09/38.82)	607/572 (50.58/47.67)
Standardized type/token ratio Sub/Dub (%)	54.50/45.04	46.70/47.40
Words per minute Sub/Dub	51.5/86.27	120.5/110.5
Total sentence count Sub/Dub	177/234	240/235
Average sentence length Sub/Dub	3.20/4.05	6.02/ 5.64
Narrative complexity		
Number of places	9 (0.81)	7 (0.58)
Number of characters (total)	13 (1.18)	7 (0.58)
Primary	6 (0.54)	2 (0.17)
Number of flashbacks	0	2

Table 1
Complexity indices for the two film excerpts employed in the studies.

3.1.2 Behavioural measures: Film-related questionnaires

In both studies, participants watched a film excerpt while their eye movements were recorded, and after the viewing session, they had to complete some questionnaires (cf. Paragraph 3.2 *Procedure*). The questionnaires were prepared and adapted based on Perego *et al.* (2015, 2016). They included a *subtitle-reading check* verifying whether participants exposed to subtitles actually paid attention to the subtitles and a *questionnaire on dubbing and subtitling* appraising their viewing habits and their appreciation of both audiovisual translation modes.

Cognitive measures were collected through a 13-question 3-item multiple-choice *questionnaire on general comprehension* to appraise whether participants understood the plot and the main conceptual aspects of the film fragment; a 10-question 3-item *questionnaire on dialogue recognition* to appraise the ability to recognize specific words or phrases presented in the film, excluding synonyms that were not used; a 5-item *face-name association test* to

[2] We used the software *WordSmith Tools 6* for the total word count, the count of types, the standardized type/token ratio, and the total sentence count. We calculated the average sentence length dividing the total number of words by the total number of sentences (Li 2000, p. 236). We obtained the words-per-minutes count dividing the total word number by the length of the film excerpt. Figures in parentheses, following raw complexity indices, indicate complexity values per minute (when applicable).

appraise whether participants associate the name of each character among eight alternative names with the character's image taken from the clip; a 30-item *visual scene recognition test* to appraise whether participants remembered which element was part of the video they saw (only half of the frames had actually been presented, the remaining 15 frames were foils).

Evaluative measures included an 11-item *evaluative questionnaire* to appraise the degree of film appreciation (8 items), self-reported effort during film viewing (2 items), judgements of plot complexity (4 items), visual scene complexity (2 items), dialogue complexity (2 items), and judgement of film comprehension (1 item).

3.1.3. Eye-tracking data

Participants' eye movements were recorded using a Tobii T60 eye tracker (Tobii Technology, AB, Stockholm, Sweden). This remote eye tracker is integrated in a 17-inch TFT monitor with a 1024×768 resolution. Stimuli are presented directly on the monitor. The video resolution was adapted so the image would fit the whole screen. The eye-tracking system is unobtrusive and allows for a large degree of head movement, ensuring natural behaviour and ecologically valid results. It has a sampling rate of 60 Hz. During the recording time, the Tobii T60 eye tracker collects raw gaze data every 16.6 ms. Using a filter, the coordinates of the movements recorded by the eye tracker are parsed into fixations and saccades. We used the Tobii I-VT fixation filter to process the raw data obtained from the eye tracker. As in most eye-tracking studies, for the subtitle condition, we divided the screen into two areas of interest (AOIs) (Kruger *et al*. 2015), namely the subtitle area at the bottom of the screen, and the image area (Figure 1).

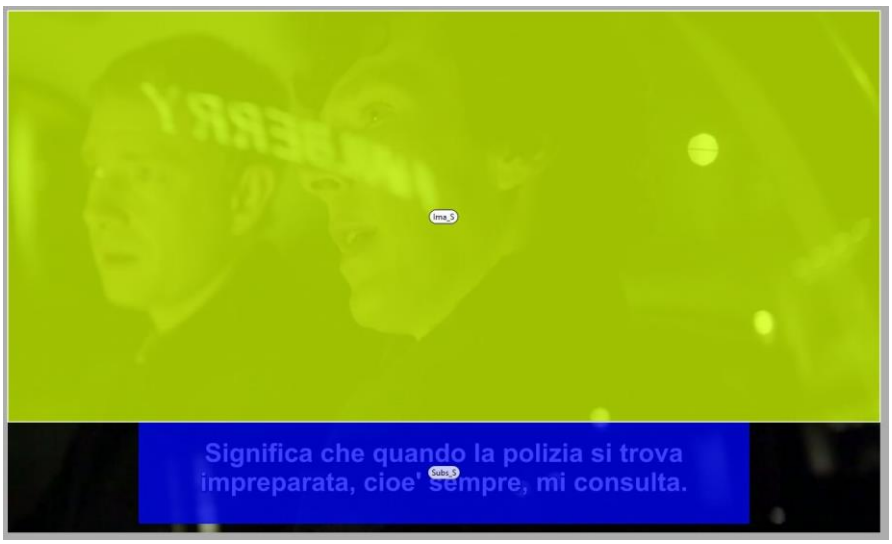

Figure 1
Areas of Interest: image and subtitle areas.

In the case of the dubbed content, we only analysed the fixations that were recorded in the image area of the screen and did not draw any other specific AOIs. When using the eye-tracking data to test our hypotheses, we drew on three types of measurements: number of fixations, mean fixation duration and percentage amount of time spent on the defined AOIs, namely the subtitle area and image area. These measures are relevant to gain knowledge of visual attention distribution and are employed as a proxy to estimate to what extent the subtitles are read.

3.2 Procedure

The studies were conducted in Italy, traditionally a dubbing country. The video excerpts selected for the studies were either shown with Italian subtitles or dubbed into Italian. Viewers were randomly assigned to two groups in a between-subjects design: one group was exposed to the subtitled excerpt (the Sub group/condition) and the other to the dubbed excerpt (the Dub group/condition). Participants were tested individually in a specifically equipped room. They were seated in a comfortable, stable chair, with the eyes at a distance of about 70 cm from the eye-tracker screen. The eye tracker was set up and calibrated at the beginning of each session. Calibration consisted of fixating a 9-point grid with randomized target order, followed by a calibration-accuracy validation and re-calibration, when necessary. Headphones were used to minimize external noise and distraction.

In the Sub condition, participants were not made aware of the AVT method and of the original language of the film in advance, which was unknown to all of them, to make sure that the comprehension of the subtitled version of the video depended entirely on the subtitles (vs. spoken dialogues). Participants were asked to watch the film as they would normally do at home. They were given on-screen instructions[3] and a short general introduction to the film.

After watching the video, participants were given the questionnaires and they were asked to fill them out in a specific order: (1) evaluative questionnaire; (2) face-name association task; (3) general comprehension; (4) visual scene recognition; (5) dialogue recognition; (6) subtitle-reading checks; (7) questionnaire on viewing habits and on dubbing and subtitling; (8) demographic questionnaire. Filling in the questionnaires was a self-paced task and it took approximately 20 minutes. Subtitle-reading checks were administered after the viewing session only to participants exposed to the subtitled excerpts.

The main dependent variables were measures of cognitive performance as well as evaluative measures. Cognitive performance was assessed through measures of general comprehension, dialogue recognition, face-name association, and visual scene recognition, thus encompassing both visual and verbal aspects of performance. Evaluative measures included film appreciation, self-reported effort during film vision, metacognitive judgements of memory, judgements of plot complexity (including judgement on the linearity of narrated events, degree of complexity of the plot; Murphy 2007), visual scene complexity, and dialogue complexity. These measures concern the evaluation of the behavioural and hedonic aspect and subjective judgements of facets of performance that can be related to cognitive and evaluative effects. Procedures and measures followed previous research on dubbed and subtitled audiovisual processing (Orrego-Carmona 2015; Perego *et al.* 2010, 2015, 2016; Wissmath *et al.* 2009).

4. Study 1: *Caramel*

4.1. Participants and design

The sample originally consisted of 38 undergraduate students of the University of Trieste who took part in the experiment and received course credits for participation. All participants were Italian native speakers and had normal or corrected-to-normal vision. Eight participants who

[3] "You are going to see a short film excerpt. Follow it as if you were at home or at the movies. After watching the film excerpt, you will be asked to answer a few questions".

had already watched the film were removed from the analysis. The final sample counts 30 participants (80% female, range 20-28 years, M = 21.60 SD = 2.33). 70.0% of participants stated that they watch dubbed films from *fairly often* to *always*, whereas 46.7% reported the same for subtitled films. A moderately complex video excerpt was presented to participants either dubbed into Italian or in Lebanese Arabic with Italian subtitles in a between-subject design. Participants were randomly assigned to two experimental conditions (Sub: n = 16, Dub: n = 14).

4.2. Video material

A 10-minute video excerpt taken from the Lebanese comedy/light drama *Caramel* was used in the experiment. The video was moderately complex, i.e. narratively conventional (clear narration, linear events; Barsam 2007), medium-paced (Lang *et al.* 1993, 2000), and was not too easy or too difficult to understand and remember (as shown in the descriptive statistics in Perego *et al.* 2015). In the study we used the commercialized DVD subtitles and dubbed version made by professionals in line with Italian standards. The Italian translations were not manipulated by the researchers. Details on the complexity indexes for Caramel are shown in Table 1.

4.3. Results

4.3.1. Subtitle-reading checks

Seventy-five percent of the sample in the Sub group correctly remembered the alignment of subtitles and 50% of the sample correctly remembered their colour. Eighty-three percent of the participants in this group claimed that they have used the subtitles *often* or *always* to help their understanding of the film. As for the difficulty in reading subtitles, 83% of the group provided judgements ranging from *neither easy nor difficult* to *very easy*. Finally, 62.6% of the group claimed that the subtitles remained on the screen at least for a *fair amount of time.* These findings indicate that the participants read the subtitles, they read them with apparent ease and they seemed to rely on them to understand the film.

4.3.2. Questionnaire on dubbing and subtitling

The Sub group claimed they watch subtitled films more often than the Dub group (Dub: M = 3.21, SD = 1.31; Sub: M = 4.81, SD = 2.01; $t(28) = 5.31$, $p = .017$); the Dub group claimed that they see dubbed films more frequently than the subtitling group (Dub: M = 5.64, SD = 1.50; Sub: M = 4.19, SD = 1.80; $t(28) = 0.71$, $p = .024$). Although there seems to be a difference between the two groups in how disturbing they generally consider watching a film in a foreign language is (Dub: M = 3.93, SD = 1.82; Sub: M = 5.06, SD = 1.98), the statistical tests did not provide any significant results to support this difference ($t(28) = 0.29$, $p = .12$).

Regarding the stance of the participants on the potential usefulness of interlingual subtitles, compared to the Dub group the Sub group considered the subtitles more helpful for both film understanding (Sub: M = 6.50, SD = 0.82; Dub: M = 4.14, SD = 1.79; $t(28)$ = 4.74, $p < .001$) and visual scene recognition (Sub: M = 4.63, SD = 1.31; Dub: M = 3.14, SD = 1.56; $t(28) = 2.83$, p = .009).

4.3.3. Cognitive measures

Internal consistency for general comprehension, dialogue recognition, face-name association, and visual scene recognition (Cronbach's α) was low to moderate, probably due to the complexity of the tasks: general comprehension (α = .26), dialogue recognition (α = .45), face-name association (α = .25), and visual scene recognition (α = .21). In order to improve consistency, we removed from the analysis 3 items from the general comprehension questionnaire (α = .35), 1 item from the face-name association (α = .33), and 5 items from the visual scene recognition (α = .34).[4] The analyses reported in this paper were carried out on the number of correct responses.

As shown in Table 2, no differences between the Dub and the Sub groups were found in general comprehension ($t(28) = 0.41$, $p = .68$), dialogue recognition ($t(28) = 1.03$, $p = .31$), face-name association ($t(28) = 0.30$, $p = .77$), and visual scene recognition ($t(28) = 0.40$, $p = .69$).[5]

	Dub		Sub	
	M	SD	M	SD
Cognitive measures				
General comprehension	8.14	0.95	8.32	1.25
Dialogue recognition	7.21	1.37	7.82	1.76
Face-name association	1.14	0.86	1.25	1.06
Visual scene recognition	21.36	2.21	21.63	1.45
Evaluative Measures				
Film appreciation	34.00	4.91	34.31	4.77
Self-reported effort	11.29	2.01	10.06	2.29
Plot complexity	11.93	4.32	14.13	4.18
Visual scene complexity	10.29	1.44	9.88	1.31
Dialogue complexity	10.79	1.19	10.13	2.19
Judgement of film comprehension	5.36	0.63	5.13	0.89

Table 2
Descriptive statistics for the dependent variables as a function of translation methods in Study 1.

4.3.4. Evaluative measures

Data were analysed using six main indices: film appreciation, self-reported effort during film vision, judgements of plot complexity, visual scene complexity, dialogue complexity, and judgement of film comprehension. Internal consistency was moderate to high for film appreciation (α = .50), self-reported effort (α = .87), judgements of plot complexity (α = .76), visual scene complexity (α = .80), and dialogue complexity (α = .67). As shown in Table 2, results did not show significant differences between the dubbing and the Sub group on film appreciation ($t(28) = 0.18$, $p = .86$), self-reported effort ($t(28) = 1.54$, $p = .14$), judgements of plot complexity ($t(28) = 1.41$, $p = .17$), visual scene complexity ($t(28) = 0.82$, $p = .42$), dialogue complexity ($t(28) = 1.01$, $p = .32$), and judgement of comprehension ($t(28) = 0.82$, $p = .42$).

[4] The removal was done according to the values of the overall *Alpha* if each item was not included in the calculation.

[5] Ranges of scores for Cognitive measures were: 0-10 for General comprehension; 0-10 for Dialogue recognition; 0-4 for Face-name association, and 0-25 for Visual scene recognition. Range scores for Evaluative measures were: 8-56 for Film appreciation; 2-14 for Self-reported effort; 4-28 for Plot complexity; 2-14 for Visual scene complexity; 2-14 for Dialogue complexity and 1-7 for Judgements of film comprehension.

4.3.5 Eye-tracking measures

Data were examined considering six indices for both the subtitled and the dubbed film excerpts: (1) the mean fixation duration on the image area; (2) the number of fixations on the image area; (3) the mean fixation duration on the subtitle area; (4) the number of fixations on the subtitle area; (5) the percentage amount of time spent on the subtitle area, and (6) the percentage amount of time spent on the image area. Data are reported in Table 3. We first run paired samples t-test in order to compare the mean fixation duration, the number of fixations, and the percentage amount of time spent on the image and subtitle areas for the Sub group. A significant difference between image and subtitle areas emerged in terms of mean fixation duration ($t(16) = 12.70$, $p < .001$), number of fixations ($t(16) = 7.41$, $p < .001$) and percentage amount of time spent on each area ($t(16) = 20.69$, $p < .001$). For the Sub group, the image area was associated with longer and more fixations, and the Dub group's visual behaviour was similar.

We then looked at possible differences in terms of mean fixation duration and number of fixations on the image area as a function of the condition (Sub vs. Dub). Data showed that the Sub group and the Dub group did not differ significantly in mean fixation duration on the image area ($t(32) = 1.50$, $p = .14$). Groups differed significantly in terms of number of fixations on the image area ($t(32) = 6.77$, $p < .001$), with the Dub group naturally making more fixations than the Sub group.

	Dub		Sub	
	M	SD	M	SD
Mean fixation duration (ms)				
Image area	312.77	73.30	277.24	64.14
Subtitle area			191.99	25.49
Number of fixations				
Image area	1698.71	222.48	1250.94	157.45
Subtitle area			669.59	138.78
Percentage of time on each area (%)				
Image area			72.71	4.52
Subtitle area			27.29	4.52

Table 3
Descriptive statistics for the eye tracking data as a function of translation methods in Study 1.

4.3.6. Correlations between cognitive, evaluative, and eye-tracking data

We evaluated the existence of significant correlations between cognitive and evaluative data with mean fixation duration and number of fixations on the image area, separately for each group (the Sub and the Dub groups). To this end, we carried out a series of bivariate Pearson's correlations. For the Dub group, the only significant correlation was between the mean fixation duration and the number of fixations with general comprehension ($r_{\text{number of fixations}}(17) = 0.52$, $p = .032$ and $r_{\text{mean fixation duration}}(17) = -0.58$, $p = .016$). Shorter mean fixation durations are associated with higher general comprehension levels. All other correlations with cognitive and evaluative measures and eye-tracking data were not significant (rs < .38). For the Sub group, no significant correlations emerged (rs < .37). Hence, the eye-tracking data did not correlate with any of the cognitive or evaluative variables for this group.

4.4. Discussion

Study 1 was designed to assess the cognitive and the evaluative differences in the reception of a moderately complex subtitled and dubbed product, to assess whether a subtitled and a dubbed film are scanned in a different way, and to assess whether there is any correlation between the cognitive and the evaluative performance of the viewers and their film scanning behaviour.

Regarding the cognitive and the evaluative reception of a subtitled vs. dubbed film, Study 1 replicated the findings of earlier studies comparing dubbing and subtitling (Perego *et al.* 2015, 2016; Wissmath *et al.* 2009), thus confirming that the cognitive processing of subtitled material is as effective as the processing of dubbed material. Participants achieved the same level of understanding, dialogue recognition, face-name association and memory for visual information irrespective of the translation method they were exposed to. Furthermore, they appreciated equally both translation methods and displayed the same degree of subjective effort both when the film was dubbed and when it was subtitled (Table 2). These results therefore confirm further that moderately complex AV products are processed effectively also when they are subtitled, and as a consequence viewers enjoy the film experience.

Besides replicating behavioural results, Study 1 employed eye-tracking measures. The eye-tracking data support the fact that, in the presence of subtitles, attention is necessarily divided between the image area and the subtitle area (Figure 2), thus causing a reduction in the number of fixations that people make on the image. However, the fact that no significant differences were found in the mean fixation durations on the image area under the two conditions suggests that subtitling does not necessarily alter the way in which viewers engage with the image area – and in fact, they remember the visuals of the film equally well in both conditions. Furthermore, the fact that viewers in both conditions make longer and more frequent fixations on the image area of the screen disproves the idea that the viewers' eyes spend most of the watching time reading subtitles (e.g. Marleau 1982: 276). This confirms that the addition of subtitles does not result in a cognitive overload.

Dubbing condition

Subtitling condition

Figure 2
Gaze plot comparing a 10-second scene from Study 1.

Overall, both behavioural and eye-tracking data suggest that processing and integrating written verbal information, pictorial information, and information coming from the audio channel occurs with relative ease when neither channel exposes the viewer to excessively complex messages. The effectiveness of these processes, however, could be compromised if one or more of these channels is very dense or taxing to the viewer. We tested this possibility in Study 2.

5. Study 2: BBC *Sherlock*

5.1. Participants and design

The sample originally consisted of 39 undergraduate students from the University of Trieste who took part in the experiment and received course credits for participation. Participants who had already watched the episode (n = 8) were removed from the analysis. The final sample numbers 31 participants (80.6% female, range 20-28 years, M = 21.58 SD = 2.19). 71% of participants stated that they watch dubbed films from *fairly often* to *always*, whereas 48.3% reported the same for subtitled films. A complex video excerpt was presented to participants either dubbed into Italian or in Russian[6] with Italian subtitles in a between-subject design. Participants were randomly assigned to two experimental conditions (Sub: n = 16; Dub: n = 15).

5.2. Video material

A 10-minute video excerpt was taken from BBC *Sherlock* (Series 1, Episode 1), a modern-day successful crime drama. The excerpt was taken from the first episode of the series to reduce the possibility that the lack of previous information about the show could affect the results. The video is complex: it is fast-paced (Lang *et al.* 1993, 2000), its narrative structure includes several interweaving story lines and alterations in chronology that might entail strong viewer engagement and observational skills (Barsam 2007; Murphy 2007), it integrates free-floating text in its narrative (Dwyer 2015; Jenkins 2010, 2011; Pratten 2015). The subtitled and the commercialized dubbed version made by professionals in line with Italian standards were used in this study, and the Italian translations were not manipulated by the researchers. Details on the complexity indexes for *Sherlock* are shown in Table 1.

5.3. Results

5.3.1. Subtitle-reading checks

Seventy-five percent of the sample in the Sub group correctly remembered the alignment of subtitles and 50% of the sample correctly remembered their colour. Eighty-one percent of the participants in this group claimed that they used subtitles *often* or *always* to help their understanding of the film. As for the difficulty in reading subtitles, 93.8% of the participants provided judgements ranging from *neither easy nor difficult* to *very easy* and all the participants stated that subtitles remained on the screen at least for *a fair amount of time*.

5.3.2. Questionnaire on dubbing and subtitling

No differences emerged between groups in a general enquiry of how disturbing watching a film in a foreign language is (Dub: $M = 3.93$, $SD = 1.75$; Sub: $M = 5.06$, $SD = 1.98$; $t(29) = 1.68$, $p = .10$). Compared to the Dub group, the Sub group considered the subtitles more helpful for film understanding (Sub: $M = 6.50$, $SD = 0.82$; Dub: $M = 4.13$, $SD = 1.73$; $t(29) = 4.93$, $p < .001$) and for visual scene recognition (Sub: $M = 4.63$, $SD = 1.31$; Dub: $M = 3.20$, SD

[6] Russian was selected to substitute the original English soundtrack known by all participants. A dubbed version in Lebanese Arabic would have made the two excerpts more comparable, but it was not found on the market or online.

= 1.52; $t(29) = 2.80$, $p = .009$). A significant difference was found in how often participants see subtitled (Dub: $M = 3.33$, $SD = 1.35$; Sub: $M = 4.81$, $SD = 2.01$; $t(29) = 2.39$, $p = .02$) and dubbed (Dub: $M = 5.67$, $SD = 1.45$; Sub: $M = 4.19$, $SD = 1.80$; $t(29) = 2.51$, $p = .02$) films, i.e., the Sub group claimed they watch subtitled films more often than the Dub group and the Dub group claimed that they see dubbed films more frequently than the Sub group.

5.3.3. Cognitive measures

Internal consistency for cognitive measures (Cronbach's α) was low to moderate: general comprehension (α = .25), dialogue recognition (α = .43), face-name association (α = .27), and visual scene recognition (α = .19). Given the unacceptable internal consistency for dialogue recognition, four items were removed for general comprehension (α = .35), one item was removed for face-name association (α = .36), and three items were removed for visual scene recognition (α = .35). The analyses reported in this paper were carried out on the number of correct responses for each measure. As shown in Table 4, no differences between the Dub and the Sub groups were found in general comprehension ($t(29) = 1.10$, $p = .28$), dialogue recognition ($t(29) = 1.20$, $p = .24$), face-name association ($t(29) = 0.52$, $p = .61$), and visual scene recognition ($t(29) = 0.10$, $p = .92$).

5.3.4. Evaluative measures

Data were analysed using six main indices: film appreciation, self-reported effort during film vision, judgements of plot complexity, visual scene complexity, dialogue complexity, and judgement of film comprehension.[7]

	Dub		Sub	
	M	SD	M	SD
Cognitive measures				
General comprehension	8.33	0.90	7.86	1.36
Dialogue recognition	7.13	1.36	7.81	1.76
Face–name association	1.07	0.88	1.25	1.06
Visual scene recognition	23.93	1.98	24.00	1.79
Evaluative Measures				
Film appreciation	33.80	4.80	34.31	4.77
Self-reported effort	11.20	1.97	10.06	2.29
Plot complexity	11.87	4.17	14.13	4.18
Visual scene complexity	10.73	1.16	10.13	2.19
Dialogue complexity	10.27	1.39	9.88	1.31
Judgement of film comprehension	5.33	0.62	5.13	0.89

Table 4
Descriptive statistics for the dependent variables as a function of translation methods in Study 2.

Internal consistency was moderate to high for film appreciation (α = .51), self-reported effort (α = .87), judgements of plot complexity (α = .76), visual scene complexity (α = .80), and dialogue complexity (α = .67). As evident in Table 4, results did not show

[7] Ranges of scores for Cognitive measures were: 0-10 for General comprehension; 0-10 for Dialogue recognition; 0-4 for Face-name association, and 0-27 for Visual scene recognition. Range scores for Evaluative measures were: 8-56 for Film appreciation; 2-14 for Self-reported effort; 4-28 for Plot complexity; 2-14 for Visual scene complexity; 2-14 for Dialogue complexity and 1-7 for Judgements of film comprehension.

significant differences between the Dub and the Sub group on film appreciation ($t(29) = 0.29$, $p = .77$), self-reported effort ($t(29) = 1.48$, $p = .15$), judgements of plot complexity ($t(29) = 1.51$, $p = .14$), visual scene complexity ($t(29) = 0.96$, $p = .35$), dialogue complexity ($t(29) = .81$, $p = .43$), and judgement of comprehension ($t(29) = 0.76$, $p = .46$).

5.3.5. Eye-tracking measures

As in Study 1, data here were examined considering six indices: (1) the mean fixation duration on the image; (2) the number of fixations on the image; (3) the mean fixation duration on the subtitles; (4) the number of fixations on the subtitles; (5) the percentage amount of time spent on the subtitle area, and (6) the percentage amount of time spent on the image area. Data are reported in Table 5. We first ran a paired samples t-test within the Sub group in order to compare the mean fixation duration, the number of fixations, and the percentage amount of time spent on the image and the subtitle areas. As for the mean fixation duration, a significant difference ($t(16) = 7.28$, $p < .001$) emerged between the image and subtitle areas. No differences ($t(16) = .68$, $p = .51$) emerged between image and subtitles in terms of number of fixations. As the percentage amount of time spent on each area, a significant difference ($t(16) = 7.28$, $p < .001$) emerged between image and subtitles.

We then looked at possible differences in terms of mean fixation duration and number of fixations on the image as a function of the condition (Sub vs. Dub). Data showed that the Sub group and the Dub group differed in mean fixation duration on the image area ($t(32) = 2.96$, $p = .006$), with the Dub group making longer fixations. In addition, the two groups also differed in terms of number of fixations on the image ($t(32) = 9.99$, $p < .001$), with the Dub group making significantly more fixations than the Sub group.

	Dub		Sub	
	M	SD	M	SD
Mean fixation duration (ms)				
Image area	309.73	76.24	248.01	39.96
Subtitle area			184.38	20.28
Number of fixations				
Image area	1617.47	178.21	1061.12	144.90
Subtitle area			1122.65	287.17
Percentage of time on each area (%)				
Image area			56.23	8.72
Subtitle area			43.76	8.72

Table 5
Descriptive statistics for the eye tracking data as a function of translation methods in Study 2.

5.3.6. Correlations between cognitive, evaluative, and eye-tracking data

As in Study 1, we evaluated the existence of significant correlations between cognitive and evaluative data with mean fixation duration and number of fixations on the image area, separately for each group. To this end, we carried out a series of bivariate Pearson's correlations. For the Dub group, as in Study 1, the only significant correlation was between the mean fixation duration and number of fixations with general comprehension ($r_{\text{number of fixations}}(17) = 0.65$, $p = .005$ and $r_{\text{mean fixation duration}}(17) = -0.77$, $p < .001$). All other correlations with cognitive and evaluative measures and eye-tracking data were not significant ($rs < .37$). For the Sub group, the mean fixation duration on the image area

correlated significantly with dialogue complexity ($r_{\text{mean fixation duration}}$ (17) = 0.57, p = .017), whereas the other correlations between cognitive and evaluative data and eye-tracking data were not significant (rs < .27). Hence, participants in the Sub group with longer mean fixation durations on the image area are also those who claimed that the dialogue was complex. The other aspects showed no correlation.

5.4. Discussion

Study 2 was designed to replicate previous research (Perego *et al.* 2016) and to assess the cognitive and the evaluative differences in the reception of a subtitled and dubbed product under boundary conditions, i.e., when the product is *complex* and to assess whether there is any correlation between the cognitive and the evaluative performance of the viewers and their film scanning behaviour. Furthermore, Study 2 was designed to assess whether the complexity of the AV product can cause viewers to change significantly their scanning strategies and, if so, to see if this is somehow related to their performance.

Regarding the cognitive and the evaluative reception of a complex subtitled vs. dubbed film, unexpectedly Study 2 did not show an effect of complexity: even in boundary conditions, i.e. with complex AV material, subtitling remains as effective as dubbing, both translation methods are equally appreciated, and both require the same degree of subjective effort. Contrary to what we expected, these results do not show a different pattern of findings when compared with the findings of Study 1 and with previous investigations on moderately complex films (e.g. d'Ydewalle, De Bruycker 2007; Orrego-Carmona 2015; Perego *et al.* 2010, 2015). However, they differ from the findings that emerged when testing viewers on longer versions of the same AV materials (Perego *et al.* 2016): with longer excerpts, the perceived effort is higher and the cognitive outcomes of the processing (i.e. comprehension and memory for presented information) are worse for the subtitled version.

Overall, we believe that the lack of cognitive and evaluative differences found in this Study might be ascribed to three factors: first, a better ability to concentrate and to compensate for complexity when the AV material is short (10 vs. 26 minutes). Second, a better ability to concentrate on the tasks and to perform better due to the individual experimental sessions (e.g. Nichols, Maners 2008). Third, a possible enhanced motivation and interest elicited by the complexity of the material itself. These factors might also explain why viewers did not judge the plot, the visuals and the dialogues as complex, when in fact our indicators show that the *Sherlock* excerpt is potentially more demanding than the *Caramel* excerpt (Table 1).

To sum up, our behavioural data suggest that, if the stimulus is short, processing and integrating written verbal information, pictorial information, and information coming from the audio channel occur with relative ease even when some channels expose the viewer to complex messages.

However, although the cognitive and the evaluative measures were good irrespective of the translation method, eye-tracking data indicate that the way people engage with the exploration of the image does differ depending on the presence of subtitles. These differences emerge when comparing people's mean fixation durations and number of fixations on the image under the two conditions. Watching *Sherlock*, the Dub group made more and longer mean fixations on the image area than the Sub group. This suggests that processing salient and information-rich visuals requires considerable visual (and possibly cognitive) attention (Farah 2000). The Sub group, on the other hand, spent a high percentage of time on the subtitle area and made fewer and shorter mean fixations on

the image area. This suggests that having to split their attention between subtitles and images prevents viewers from focusing on the images for as much time as necessary to process them effectively. Our eye-tracking results also suggest that in spite of its cognitive effectiveness, in fact the processing of a complex subtitled film might require more effort, and it might turn the viewing process into a primarily reading process, too (as claimed by Jensema *et al.* 2000). In fact, the average percentage amount of time spent on the subtitle area is quite high (44%), and the mean fixation duration is short (184.38ms), even shorter than the mean fixation durations reported by Rayner (1984) for silent reading (225 ms) and oral reading (275 ms).

6. General discussion and conclusions

This research constitutes one of the first initiatives to test empirically the differences in the cognitive, evaluative and visual reception of subtitled and dubbed products using both behavioural and eye-tracking measurements and varying the AV material in terms of complexity. Our aim was to replicate a previous study (Perego *et al.* 2016) using shorter versions of the same AV material in order to gather eye movement data, too.

In more general terms, the design adopted for the project also allowed us to observe how dubbing and subtitling affect attention allocation, confirming that the presence of subtitles affects the way in which the images are scanned (Kruger *et al.* 2014): subtitling turns the subtitle area into a central focus of attention whereas dubbing lets the focus of attention be the centre of the screen (Figure 3).

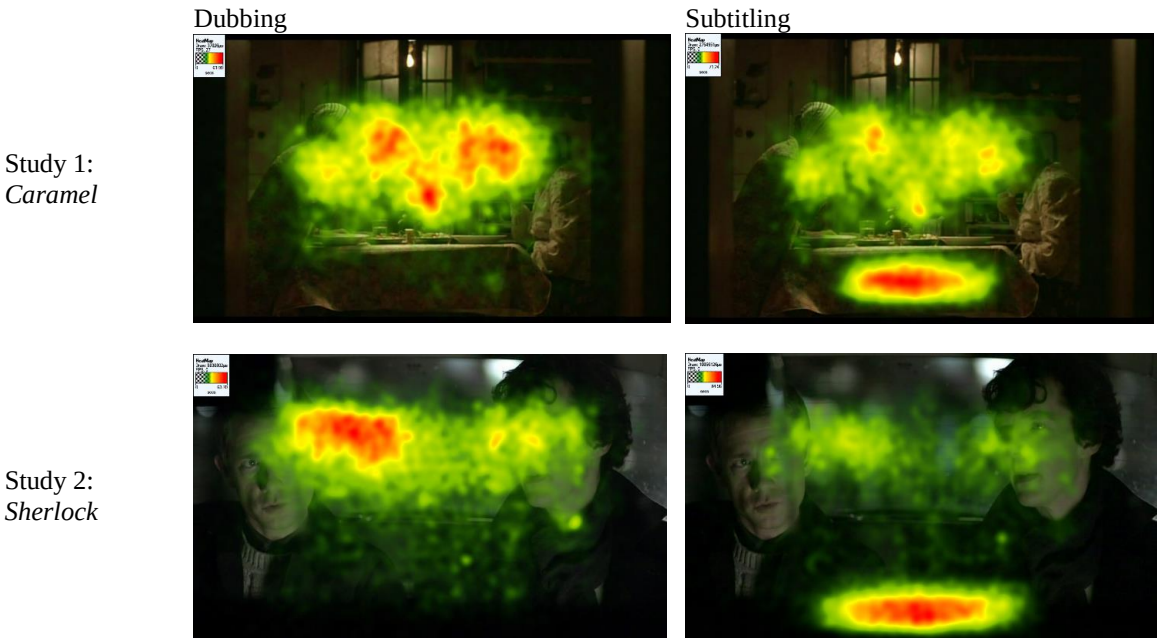

Figure 3
Heatmaps showing the accumulative duration of fixations for all of the participants watching the excerpts under the dubbing or the subtitling conditions in Study 1 and Study 2.

However, while it is true that subtitles demand the attention of the viewers in different amounts depending on the complexity of the AV product (in the case of our studies, 27.29% in Study 1 and 43.76% in Study 2), our behavioural data do not indicate that this necessarily affects the comprehension and memory of the viewers or makes the viewing

process less enjoyable, as argued by Marleau (1982) and Orrego-Carmona (2015). This holds if the AV material is short and it is easier for viewers to concentrate on it. We believe that the effect of complexity could emerge in other, more demanding situations (as in Perego *et al.* 2016). These include cases when the complex subtitled product is longer than 10 minutes (e.g. a whole feature film); when its content is new to the viewer (Winke *et al.* 2013); when viewers are not familiar with the translation method; and finally when viewers are not familiar with the language of the subtitles, as in language learning contexts (Kruger *et al* 2014; Winke *et al.* 2013).

A further consideration pertains to the fact that in our studies, which have been conducted in a traditionally dubbing country, the participants who watched the subtitled excerpts were unexpectedly familiar with the subtitling translation mode: they claimed that they use subtitles *often* or *very often* (cf. Paragraph 4.1 and Paragraph 5.1). This could partly explain why there are no significant differences in the cognitive and behavioural measurements. Additionally, the fact that the participants in both studies were university students could also affect how they engaged with content. Participants could have already internalized and adapted to the cognitive demands of subtitles, and therefore had a good performance. In spite of this, our findings suggest the percentage of time allocated to the subtitled area was consistently guided by the nature of the audiovisual product, which might support the idea of the almost automation of subtitle reading proposed by d'Ydewalle *et al.* (1991) and refined by d'Ydewalle and De Bruycker (2007).

Although our findings are preliminary, we believe that they have the following theoretical and methodological merits: from a theoretical point of view, they advance our knowledge on the way subtitled films are processed and scanned, thus contributing to the setting up of a clearer theoretical framework of AVT consumption in different AVT situations (more vs. less complex; subtitled vs. dubbed material).

In considering complexity as an important variable, our study stresses the methodological need to take into account systematically the nature of the stimuli used in AVT empirical research. In particular, researchers should be more aware of the visual, narrative and linguistic complexity of the stimuli they use (as in Perego *et al.* 2016). Although the level of complexity of the material under study could influence the results of a study, this has never been considered explicitly in earlier AVT research.

A further feature of the AV stimuli used in experiments that has often been overlooked in empirical research in AVT is length. Our results seem to indicate that short clips tend to be processed more easily irrespective of their complexity, in our case neutralizing the complexity effect found with longer excerpts in Perego *et al.* (2016). This calls for a greater methodological awareness in future empirical research. Most early empirical studies based their generalizations on results obtained testing excerpts not exceeding 60-120 seconds.

Our results confirm the potential of combining behavioural and eye-tracking measures. Eye movement data are in fact complementary to other traditional measures. In our study, the absence of a complexity effect on the cognitive performance and evaluation of the viewers was complemented by eye movement data suggesting that in fact complexity changes the way a subtitled video is scanned and therefore pointing to the presence of a possible covert cognitive effort.

Although we believe that this study opens a productive line of enquiry, some of its limitations have to be highlighted. In the first place, it uses two AV products that do not only vary in complexity and subtitling rate, but also in cultural context and source language, genre and nature of subtitles (edited and condensed in Study 1 vs. almost verbatim in Study 2; Perego *et al.* 2016). Our choice of the stimuli was made to

accomplish the ecological validity of the study: we used authentic material and wanted to test users' reactions to AV products they would watch in real life. Future research could consider capitalizing on this study and replicating it by resorting to more comparable materials. This would enable researchers to isolate and study one variable at a time (e.g. linguistic or narrative complexity, effect of more or less complex subtitles, etc.), and finally accepting the findings as well-established.

In the second place, our study highlights the problem of sampling: it is difficult to recruit big and representative samples of the population especially when tracking eye movements. In total, 29% of the participants in Study 1 and 25% of the participants in Study 2 did not provide enough good-quality eye-tracking data for the analysis. This is within the expected data loss for eye tracking experiments mentioned by Saldanha and O'Brien (2013), but still constituted a burden for researchers who have to look for extra participants in order to have enough data to perform the analysis. Further, future studies should be extended to other groups of participants to explore how the wider audience, and not only university students, engage with translated audiovisual content. At the same time, this would help in minimizing the impact that the observer's paradox (Labov 1972) might have on reception studies conducted at universities with university students.

Additionally, in terms of analyses, we relied on the allocation of attention to different AOIs as an indicator of engagement with the audiovisual content. However, these data could also be used to analyse viewing strategies in more detailed and finer-grained explorations which could also assess how different AV traditions affect engagement.

These considerations show that although experimental research on AVT has been active for some time now and delivers useful results, the experimental approach is still new to this field, which has been absorbing and adapting methodology from other fields and lacks steady reference to a commonly agreed framework. Our study is an attempt to make a contribution in this direction.

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References

Barsam R. 2007, *Looking at Movies. An Introduction to Film*, Norton & Company, New York.

Bazin A. 1967, *What is Cinema?*, University of California Press, California.

Chmiel A. and Mazur I. 2016, *Researching Preferences of Audio Description Users – Limitations and Solutions*, in Perego E. (ed.), *Empirical Approaches to Audiovisual Translation*, Special Issue of "Across Languages and Cultures" 17 [2], pp. 271-288.

d'Ydewalle G., Praet C., Verfaillie K. and Van Rensbergen J. 1991, *Watching Subtitled Television. Automatic Reading Behaviour*, in "Communication Research" 18, pp. 650-666.

d'Ydewalle G. and De Bruycker W. 2007. *Eye Movements of Children and Adults while Reading Television Subtitles*, in "European Psychologist" 12, pp. 196-205.

Dwyer T. 2015, *From Subtitles to SMS: Eye Tracking, Texting and Sherlock*, in "Refractory. A Journal of Entertainment Media". http://refractory.unimelb.edu.au/2015/02/07/dwyer/ (5.26.2016).

Farah M.J. 2000, *The Cognitive Neuroscience of Vision*, Blackwell Publishers, Oxford.

Goldstein R.B., Woods R.L. and Peli E. 2007. *Where People Look when Watching Movies: Do All Viewers Look at the Same Place?*, in "Computers in Biology and Medicine" 37 [7], pp. 957-964.

Grimes T. 1991, *Mild Auditory-Visual Dissonance in Television News May Exceed Viewer Attentional Capacity*, in "Human Communication Research" 18, pp. 268–298.

Hinkin M.P., Harris R.J. and Miranda A.T. 2014, *Verbal Redundancy Aids Memory for Filmed Entertainment Dialogue*, in "The Journal of Psychology" 148 [2], pp. 161-176.

Jenkins H. 2010, *Transmedia Storytelling and Entertainment: An Annotated Syllabus*, in "Continuum: Journal of Media & Cultural Studies" 24 [6], pp. 943-958.

Jenkins H. 2011, *Transmedia 202: Further Reflections. Confessions of an AcaFan.* http://henryjenkins.org/2011/08/defining_transmedia_further_re.html (5.26.2016).

Jensema C.J., El Sharkawy S., Danturthi R.S., Burch R. and Hsu D. 2000, *Eye Movement Patterns of Captioned Television Viewers*, in "American Annals of the Deaf*"* 145 [5], pp. 275-285.

Kruger J.L., Hefer E. and Matthew, G. 2014, *Attention Distribution and Cognitive Load in a Subtitled Academic Lecture: L1 vs. L2*, in "Journal of Eye Movement Research*"* 7 [5], pp. 1-15.

Kruger J.L., Szarkowska A. and Krejtz I. 2015, *Subtitles on the Moving Image: an Overview of Eye Tracking Studies*, in "Refractory*"* 25. http://refractory.unimelb.edu.au/2015/02/07/kruger-szarkowska-krejtz/ (5.26.2016).

Labov W., 1972, *Sociolinguistic patterns*, Blackwell, Oxford.

Lang A., Geiger S., Strickwerda M. and Sumner J. 1993, *The Effects of Related and Unrelated Cuts on Television Viewers' Attention, Processing Capacity, and Memory*, in "Communication Research" 20 [1], pp. 4-29.

Lang A., Zhou S., Schwartz N., Bolls P. and Potter R. 2000, *The Effects of Edits on Arousal, Attention, and Memory for Television Messages: When an Edit is an Edit Can an Edit be too Much?*, in "Journal of Broadcasting & Electronic Media" 44 [1], pp. 94-109.

Li Y. 2000, *Linguistic Characteristics of ESL Writing in Task-Based E-Mail Activities*, in "System" 28, pp. 229-245.

Marleau L. 1982, *Le sous-titres: Un mal necessaire*, in "Meta" 27 [3], pp. 271-285.

Monaco J. 2009, *How to Read a Film. Movie, Media and Beyond*, Oxford University Press, Oxford.

Murphy J.J. 2007, *Me and You and Memento and Fargo*, Continuum, New York.

Nichols A.L. and Maner J.K. 2008, *The Good-Subject Effect: Investigating Participant Demand Characteristics*, in "Journal of General Psychology" 135, pp. 151-166.

Orrego-Carmona D. 2015, *The Reception of (Non)Professional Subtitling*, Unpublished PhD thesis, Universitat Rovira i Virgili, Tarragona.

Pavesi M. 2005, *La traduzione cinematografica*, Carocci, Rome.

Perego E. (ed.), 2012, *Eye Tracking in Audiovisual Translation*, Aracne, Rome.

Perego E., Del Missier F. and Bottiroli S. 2015, *Dubbing and Subtitling in Young and Older Adults: Cognitive and Evaluative Aspects*, in "Perspectives: Studies in Translatology" 23 [1], pp. 1-21.

Perego E., Del Missier F., Porta M. and Mosconi M. 2010, *The Cognitive Effectiveness of Subtitle Processing*, in "Media Psychology" 13, pp. 243-272.

Perego E., Del Missier, F. and Stragà, M. 2016, *Dubbing vs. Subtitling: Complexity Matters*, Accepted for publication in "Target".

Pratten R. 2015, *Getting Started in Transmedia Storytelling: A Practical Guide for Beginners*, CreateSpace, London.

Rayner K. 1984, *Visual Selection in Reading, Picture Perception, and Visual Search: A Tutorial Review*, in

Bouma H. and Bouhwhuis D. (eds.), *Attention and Performance 10*, Erlbaum, Hillsdale, NJ.
Romero-Fresco, P. 2015, *The Reception of Subtitles for the Deaf and Hard of Hearing in Europe. UK, Spain, Italy, Poland, Denmark, France and Germany*, Peter Lang, Bern.
Saldanha G., O'Brien S. 2013, *Research Methodologies in Translation Studies*, Routledge, New York.
Szarkowska A., Krejtz I., Łogińska M. Dutka Ł. and Krejtz K. 2015, *The Influence of Shot Changes on Reading Subtitles – A Preliminary Study*, in Perego E. and Bruti S. (eds.), *Subtitling Today: Shapes and Their Meanings*, Cambridge Scholars Publishing, Newcastle upon Tyne, pp. 99-118.
Szmrecsányi B.M. 2004, *On Operationalizing Syntactic Complexity*, in Purnelle G.G., Fairon G. and Dister A. (eds.), *Le poids des mots. Proceedings of the 7th International Conference on Textual Data Statistical Analysis*, Presses Universitaires de Louvain, Louvain-la-Neuve, pp. 1032-1038.
Taylor C. 2012, *Multimodal Texts*, in Perego E. (ed.), *Eye Tracking in Audiovisual Translation*, Aracne, Rome, pp. 13-35.
Taylor C. 2016, *The Multimodal Approach in Audiovisual Translation*, in Gambier Y. and Ramos Pinto S. (eds.), *Audiovisual Translation: Theoretical and Methodological Challenges*, Special Issue of "Target" 28 [2], pp. 222-236.
Tosi V., Mecacci L. and Pasquali E. 1997, *Scanning Eye Movements Made when Viewing Film: Preliminary Observations*, in "International Journal of Neuroscience" 92 [1/2], pp. 47-52.
Winke P., Gass, S. and Sydorenko, T. 2013, *Factors Influencing the Use of Captions by Foreign Language Learners: An Eye Tracking Study*, in "The Modern Language Journal" 97 [1], pp. 254-275.
Wissmath B., Weibel D. and Groner R. 2009, *Dubbing or Subtitling? Effects on Spatial Presence, Transportation, Flow, and Enjoyment*, in "Journal of Media Psychology" 21, pp. 114-125.