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The impact of integrated subtitles on viewers' comprehension, emotions, and reception: A mixed-methods study

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Abstract: This paper reports on a mixed-methods study that examined the impact of integrated subtitles on viewers' comprehension, emotions, and reception. Two groups of Chinese viewers were randomly assigned to a control group (n = 31) and an experimental group (n = 31). The control group watched French videos with standard Chinese subtitles positioned at the bottom of the screen, while the experimental group watched the same videos with integrated subtitles placed closer to the speakers as part of the mise-en-scène. Major findings included the following: (a) the two groups did not differ in their comprehension of film content; (b) integrated subtitles modestly contributed to the participants' emotional intensity with regard to the protagonists; (c) integrated subtitles led to higher self-reported cognitive load; (d) integrated subtitles were perceived less favourably compared to the standard subtitles; and (e) presentation-, product-, and person-related factors were identified to shape the participants' perception of integrated subtitles. Building on these findings, the paper discusses some practical suggestions for promoting integrated subtitles and personalised subtitles.

Keywords: integrated subtitles, standard subtitles, audience reception, mixed-methods

1. Introduction

Different from standard bottom-centred subtitles, integrated subtitles are placed closer to the focal areas, such as speakers and objects. In theory, integrated subtitles are better than standard subtitles in three aspects. First, integrated subtitles shorten the distance between subtitles and images, which saves mental effort and allows more attention to focal areas on the screen (Brooks & Armstrong, 2014). Second, as integrated subtitles are placed next to the areas of interest, they can help viewers efficiently identify speakers and/or notice important visual details (Fox, 2018; Hu et al., 2014). This may enhance viewers' comprehension of the audiovisual content. Third, integrated subtitles move to the rhythm of on-screen images (e.g., actions and movements), so they can contribute to "a more immersive, engaging, emotive [and] aesthetically pleasing" viewing experience (Brown et al., 2015, p. 103). Despite these advantages, integrated subtitles also come with limitations, such as their lack of "spatial coherence" (Brooks & Armstrong, 2014). Unlike standard subtitles that always appear at the bottom-centre of the screen, integrated subtitles are much less predictable. Thus, viewers may expend additional cognitive effort on locating integrated subtitles. Given these potential advantages and disadvantages, audience reception studies are warranted to understand how integrated subtitles can contribute to or detract from the viewing experience. This study is situated in the body of research that attempts to "bridge the gap

between subtitle makers and subtitle users" (Szarkowska et al., 2021, p. 662) by exploring the impact of integrated subtitles on viewers' comprehension, emotions, and reception. These insights will help subtitle makers make informed decisions to promote integrated subtitles and personalised subtitles that will contribute to media accessibility for all.

2. Audience reception of integrated subtitles

The body of research on integrated subtitles is small but growing. Existing studies have used eye-tracking data and self-reported perception data to compare standard subtitles and integrated subtitles. Results have tended to show that (a) the gaze patterns in the integrated-subtitle condition are similar to those in the un-subtitled condition (Brown et al., 2015; Fox, 2018); (b) viewers spend more time on images when watching videos with integrated subtitles than with standard subtitles (Akahori et al., 2016; Black, 2022; Fox, 2018; Kurzhals et al., 2017); and (c) viewers hold a positive attitude towards integrated subtitles (Brown et al., 2015; Fox, 2018).

While the studies outlined previously have shed important light on how viewers process and perceive integrated subtitles, viewers' comprehension has received relatively less attention. To the best of the researcher's knowledge, only two studies have tested viewers' comprehension of audiovisual content but yielded inconsistent results. Hong et al. (2010) found that integrated subtitles improved content comprehension; but Black (2022) showed that integrated subtitles did not "have an effect on content comprehension" (p. 514). The discrepancy might be caused by different groups of participants. The hearing-impaired viewers in Hong et al. (2010) primarily relied on the subtitles and images to obtain information, while the hearing viewers in Black (2022) could resort to audio inputs as an extra source of information to comprehend the video content.

In addition, the existing studies have primarily focused on viewers' cognition but have not sufficiently examined viewers' emotions. Eye-tracking data have been collected to understand how different formats of subtitles could influence viewers' cognitive load and allocation of mental resources. However, viewers' emotions have been tangentially examined through questionnaire items about enjoyment (Hong et al., 2010) or aesthetic experience (Fox, 2018). Scholars have yet to explore the diverse range of emotional responses to subtitle-mediated audiovisual content and ascertain whether integrated subtitles are better than standard subtitles to induce intense emotions. In other words, more refined empirical data are needed to test the assumption that integrated subtitles contribute to an immersive viewing experience (Brown et al., 2015).

The third potential limitation of the existing studies pertains to the control of subtitle presentation. When comparing standard and integrated subtitles, few studies explicitly mentioned the comparability of presentation rate (see Black, 2022; Brown et al., 2015 for two notable exceptions). In other words, if subtitles remained on the screen for a different length of time, the differences observed between groups might not be solely attributed to the position of subtitles. Research has found that when exposed to faster subtitles, viewers may skip subtitles and have poor comprehension of the video content (Kruger et al., 2022). Therefore, it is important to control the presentation rate when we try to ascertain the extent to which the placement of subtitles influences viewers' reception.

To address the three gaps outlined above, this study (a) measured viewers' comprehension mediated by subtitles, (b) examined a wide range of viewers' emotions, and (c) controlled the presentation rates of standard and integrated subtitles. In this way, compared to previous studies, the current study obtained a more comprehensive understanding about the influence of integrated subtitles on viewers' comprehension, emotions, and reception.

3. The study

3.1 Research questions

The study was guided by the following research questions:

1. Do integrated subtitles improve viewers' comprehension of film content?
2. Do integrated subtitles enhance the intensity of viewers' emotions?
3. Do integrated subtitles increase viewers' self-reported cognitive load when watching the videos?
4. Do integrated subtitles lead to a better perception of watching subtitled films?
5. What are the possible factors that influence the viewers' reception of integrated subtitles?

To answer these questions, a "convergent" mixed-methods design (Creswell & Creswell, 2018, p. 15) was adopted to collect and triangulate quantitative (experimental) data and qualitative (interview) data. Specifically, experimental data were collected to test the following hypotheses, corresponding to the first four research questions:

H1: The comprehension of film content is better in the integrated-subtitle group than in the standard-subtitle group.

H2: The intensity of viewers' emotions is higher in the integrated-subtitle group than in the standard-subtitle group.

H3: The self-reported cognitive load is higher in the integrated-subtitle group than in the standard-subtitle group.

H4: The perception of watching subtitled films is better in the integrated-subtitle group than in the standard-subtitle group.

Triangulating the experimental data, the interview data were analysed to identify the factors that influenced the viewers' reception of integrated subtitles, thus addressing the fifth research question. A detailed description of the data analysis will be reported below.

3.2 Participants

The study involved two groups of participants: the control group (n = 31; 8 male, 23 female) and the experimental group (n = 31; 10 male, 21 female). To ensure the research quality, the group assignment was random (Mellinger & Hanson, 2017). The mean ages of the control group and the experimental group were 24.97 (SD = 3.34) and 24.52 (SD = 2.78), respectively. All participants were native Mandarin speakers and did not understand French, as will be explained in more detail below. The participants were recruited through on-campus posters at a public university, so they had educational qualifications at or above the undergraduate level. The participants reported that they were

habitual users of subtitles in simplified Chinese, which was the subtitle language used in this experiment. Specifically, they rated on a six-point scale (6 = always, 1 = never) about the frequency of reading subtitles when consuming foreign-language audiovisual products. The ratings of the experimental group (Mdn = 5; IQR = 2) did not differ from those of the control group (Mdn = 5; IQR = 2) (z = -0.630, p = 0.529).

3.3 Materials

Three scenes from a French-language romantic comedy entitled *Un homme à la hauteur* were selected as the treatment videos. French, an unknown language to the participants, was chosen because this could ensure that they read the subtitles as a source of information (see also Perego et al., 2018). The three scenes were self-contained and represented the sequential story arc of the romance. The emotions of the target protagonists in the three scenes were primarily positive, mixed, and negative (see Table 1).

Two versions of Chinese subtitles were created: integrated and standard. The placement of the integrated subtitles was based on the criteria outlined in Fox (2018, p. 166): (1) "Indicate speaker"; (2) "Indicate speaking direction"; (3) "Produce sufficient contrast"; (4) "Do no cover relevant image areas or elements". The two subtitle versions differed in their position only. Other than that, the content, speed, colour, and font size were exactly the same, and the subtitles in both versions were always presented on one line.

Table 1: Video profile

Items	Video 1	Video 2	Video 3
Duration	1 min 33 sec	1 min 24 sec	1 min 42 sec
Number of Chinese characters in the subtitles	255	164	233
Total duration of subtitles	69 sec	48 sec	63 sec
Characters per second	3.7	3.4	3.7
Emotions of the target protagonists	Primarily positive	Mixed	Primarily negative

3.4 Instruments

Four instruments were used: (a) comprehension test, (b) emotional intensity questionnaire, (c) self-reported cognitive load questionnaire, and (d) perception questionnaire.[1] Following Desilla (2014), the study used open-ended questions to test the participants' understanding of the film clips. Different from Black (2022), this study did not use multiple-choice questions to prevent the participants from guessing answers (Alfaify & Ramos Pinto, 2022). For each video, five open-ended questions were asked. The first question was about the relation between the two protagonists in the video, and the second question was about the setting of the video. The three remaining questions concerned details

[1] The questionnaire items for the emotional intensity, cognitive load, and subtitle perception were translated and adapted (trans-adapted) into Chinese from the English versions reported in the literature. In line with the advice by Dörnyei and Dewaele (2023), as the first step, the researcher trans-adapted the items into Chinese, which were checked by a research assistant. The researcher and the research assistant then discussed issues concerning accuracy and naturalness, and improved the trans-adapted items, which were back-translated into English by a colleague. No semantic issue was identified, thus ensuring the conceptual validity of the trans-adapted items.

relating to the protagonists and plot development. The participants' answers were rated on a three-point scale, with 2 indicating full comprehension, 1 indicating partial comprehension, and 0 incorrect comprehension. The author and a research assistant independently rated the answers. Discrepancy was resolved through discussion until consensus was reached. The total score of the five questions was taken as the comprehension score of a particular video.

In addition to the comprehension test, the participants completed a 6-point questionnaire about the intensity of 12 emotions: *sad*, *angry*, *scared*, *disgusted*, *disturbed*, *surprised*, *happy*, *moved*, *interested*, *content*, *enjoyable*, and *excited,* ranging from 6=very much to 1=not at all (adapted from King & Hourani, 2007; Schaefer et al., 2010). The questionnaire consisted of two parts. The first part prompted the participants to report the emotional intensity they felt for the two target protagonists in each video. The second part asked the participants to report their own emotional intensity after watching the video clip.

The participants also completed a questionnaire about their cognitive load. The self-reported cognitive load items were based on Szarkowska and Gerber-Morón (2018). The participants reported (a) the mental effort invested when watching the subtitled videos; (b) the perceived difficulty of following the subtitled videos, and (c) the level of frustration when reading the integrated or standard subtitles. They rated the items on a 6-point scale where 6 indicated "very much" and 1 indicated "not at all". The mean score of the three items was taken as the self-reported cognitive load rating.

Finally, the participants completed a questionnaire about their perception of the subtitles relating to six aspects which focused on the participants' opinions about the "intelligibility" of the subtitles (Künzli, 2021, p. 332) and their attitudes towards the subtitles. Table 2 presents the perception items and the corresponding literature that supports the inclusion of the items. The participants rated the six statements on a 6-point scale (6 = very much; 1 = not at all). The average score of the six items was taken as the perception score.

Table 2: Questionnaire items about the participants' perception of the subtitles

Perception items	Supporting literature
I think the subtitle presentation is natural.	Akahori et al. (2016); Hong et al. (2010)
I think the subtitle speed is appropriate.	Black (2022); Filizzola (2018)
I think the subtitle position is appropriate.	Black (2022); Manchón & Orero (2018)
I think the subtitles are clear.	Filizzola (2018); Hu et al. (2020)
I like the presentation format of this type of subtitles.	Filizzola (2018); Fox (2018)
I would like to watch videos with this type of subtitles.	Brown et al. (2018); Fox (2018)

3.5 Procedures

The study was conducted in two stages. In the first stage, the participants watched four videos (one baseline video + three treatment videos). Specifically, both groups watched an excerpted video from a Chinese film, which was a romantic comedy, *The Last Women Standing*, without subtitles. At the end of the video, they were prompted to take an emotional intensity questionnaire and a comprehension test. Although providing intralingual subtitles in Chinese TV shows and films has become an increasingly common practice since the late 1990s, the baseline video was intentionally un-subtitled as the neutral *tertium comparationis* (see also Baumgarten, 2022; Vandepitte, 2017) to establish the comparability of the two groups in terms of their film comprehension and

emotion *unmediated* by subtitle configuration. In this way, the between-group differences observed in the subsequent viewing sessions could be more confidently attributed to the different subtitling conditions (integrated subtitles vis-à-vis standard subtitles), thus enhancing the experimental validity.

Next, the control group watched three French videos with standard subtitles, while the experimental group watched the same videos with integrated subtitles. The presentation order of the clips was the same because (a) the study adopted a between-subject design that was less prone to order effects in an otherwise within-subject design (Mellinger & Hanson, 2017); and (b) the order represented natural, sequential progression of the story arc. At the end of each video, the participants were prompted to complete an emotional intensity questionnaire, a comprehension test, a self-reported cognitive load questionnaire, and a perception questionnaire. They were tested in small groups of about 10 participants per group in a computer lab, in which they each watched the videos with a designated desktop. The videos were played once only, but no time limit was imposed on participants to answer the comprehension questions or the questionnaires.

In the second stage, to ensure that the participants in the experimental group had "an equal chance of being selected" (Saldanha & O'Brien, 2014, p. 33), random sampling was adopted, whereby no specific criteria were pre-determined to select participants, thus allowing for a rich diversity of their views. As such, 10 participants (or one third) of the experimental group were randomly invited to take a semi-structured interview after they finished the viewing sessions. They all consented to participate in the interview, which took place one week after their viewing sessions[2]. During the interview, the videos with the integrated subtitles were played again, and the participants were asked to pause the videos whenever they felt that the subtitles exerted a negative influence on their viewing experience. Next, they were prompted to share their thoughts about the aesthetics, usefulness, usability, familiarity, and expectation of the subtitle presentation (Black, 2022; Brown et al., 2015). The interviews were conducted individually in Chinese and lasted for about 30-45 minutes.

3.6 Data analysis

For the purpose of between-subject comparison, the independent variable was the subtitle presentation mode (integrated vs. standard), and the dependent variables were the comprehension score, emotional intensity rating, self-reported cognitive load, and perception score. As the data were not normally distributed, "medians and [interquartile ranges] IQRs were reported as measures of central tendency and dispersion" (Nicklin & Plonsky, 2020, p. 36; see also Field, 2013). Mann Whitney U tests were conducted in SPSS 21 to examine whether the two groups differed significantly (Mellinger & Hanson, 2017). For the significant between-group differences, r was calculated with the absolute z-score and the total number of sample size to determine the effect sizes. The thresholds for small, medium, and large effect sizes are at 0.1, 0.3, and 0.5, respectively (Mellinger & Hanson, 2017).

[2] The interviews were not conducted immediately after the viewing sessions because the participants were tested in small groups during the viewing sessions. To maintain consistency, only the researcher served as the interviewer. Since more than one participant from a viewing session was randomly invited as the interviewee, it was not possible to simultaneously conduct multiple individual interviews immediately after each viewing session. In addition, the participants' availability varied, so it made more sense, logistically, to conduct the interviews one week after the viewing session.

The interviews were transcribed and coded. The two-cycle coding protocol developed by Miles et al. (2014) was adopted for the qualitative analysis. In the first cycle, *in vivo* codes were used to capture and "honor the participant's voice" (Miles et al., 2014, p. 74). Specifically, the participants' own words were used as codes, for instance, "action-packed films" and "romance films". In the second cycle, pattern coding was performed to tease out the common themes underlying the *in vivo* codes. To continue the previous examples, a pattern code "genre" was generated to represent the *in vivo* codes of "action-packed films" and "romance films". Using this two-cycle protocol, the author coded the transcripts, following which a research assistant checked the codes for conceptual validity and consistency. After discussion, the author and the research assistant agreed on seven factors (grouped into three themes) which might influence participants' reception of the integrated subtitles (see Table 7).

4. Results

4.1 Quantitative results

As the participants rated the intensity of 12 emotions for the two protagonists of each video and for their after-viewing experience, this created a large number of statistics. To save space, descriptive and inferential statistics are reported in the main text for the instances of emotional intensity with significant between-group differences. For other non-significant emotional intensity results, the statistics can be found in the Appendices.

Video 0, the Chinese video without subtitles, was used to ensure the comparability of the two groups. The comprehension score of the experimental group (Mdn = 9; IRQ = 1) did not differ from that of the control group (Mdn = 9; IQR = 2) (z = -0.538, p = 0.591). The two groups did not differ in the intensity of the 12 emotions for the two protagonists or for their viewing experience (see Appendix 1). This suggests that the two groups were comparable in terms of their baseline comprehension level and emotional intensity. The following sections will report on the analysis with regard to the comprehension, emotional intensity, self-reported cognitive load and subtitle perceptions respectively.

4.1.1 Comprehension

Table 3 shows the comprehension scores of the experimental group and the control group. As can be seen, the two groups did not differ in terms of their comprehension of the three videos. This suggests that the presentation styles of the subtitles (standard or integrated) did not influence the viewers' comprehension of the videos.

Table 3: Between-group comparison of comprehension scores (out of a maximum score of 10)

Items	Experimental Group		Control Group		*z*	*p*
	Median	IQR	Median	IQR		
Video 1	8	3	8	2	-1.03	0.303
Video 2	7	2	7	4	-0.677	0.498
Video 3	9	1	9	1	-0.755	0.45

4.1.2 Emotional intensity

Three between-group differences of emotional intensity were found, as shown in Table 4. Compared with the control group, the experimental group felt significantly happier for the second protagonist in Video 1 and felt more

disturbed and surprised for the first protagonist in Video 3, with small to medium effect sizes. Other than these three instances, the two groups did not differ in the emotional intensity either for the protagonists or for their own viewing experiences (see Appendices 2-4).

Table 4: Between-group comparison of emotional intensity (out of a maximum score of six)

Emotions	Experimental Group		Control Group		*z*	*p*	*r*
	Median	IQR	Median	IQR			
Happy: Video 1 Protagonist 2	6	1	5	1	-2.391	0.017	0.30
Disturbed: Video 3 Protagonist 1	6	1	5	2	-2.329	0.02	0.30
Surprised: Video 3 Protagonist 1	6	0	6	1	-1.999	0.046	0.25

4.1.3 Self-reported cognitive load

Table 5 shows the cognitive load reported by the experimental group and the control group. The self-reported cognitive load of the two groups differed significantly, with small to medium effect sizes. Both groups scored below three out of a maximum rating of six, indicating that they did not experience heavy cognitive load. However, the experimental group scored significantly higher and thus expended more effort on following the subtitles (the integrated subtitles appeared more cognitively taxing than the standard subtitles).

Table 5: Between-group comparison of self-reported cognitive load

Items	Experimental Group		Control Group		*z*	*p*	*r*
	Median	IQR	Median	IQR			
Video 1	2.67	3	2	1.67	-2.113	0.035	0.27
Video 2	2.67	2.67	1	2	-2.544	0.011	0.32
Video 3	2.67	2	1	1.67	-2.074	0.038	0.26

4.1.4 Perceptions

Table 6 reports the participants' perception ratings of the subtitles out of a maximum rating of six. The Mann Whitney U tests showed that the two groups differed significantly in their perceptions of the subtitles in all three videos, with medium to large effect sizes. The control group had a relatively positive attitude towards the standard subtitles, while the experimental group had a relatively negative attitude towards the integrated subtitles.

Table 6: Between-group comparison of perceptions of subtitles

Items	Experimental Group		Control Group		*z*	*p*	*r*
	Median	IQR	Median	IQR			
Video 1	3.33	1.67	4.17	1.17	-4.423	<0.001	0.56
Video 2	3.33	1.67	4.17	1	-3.487	<0.001	0.44
Video 3	3.33	1.83	4.17	1.33	-3.472	0.001	0.44

4.2 Qualitative results

Table 7 presents a summary of the qualitative analysis of the interviews, identifying seven factors grouped into three themes. Table 7 also shows the frequency of participants citing these factors as positively or negatively influencing their perceptions. The following subsections will illustrate these factors with the participants' interview extracts in greater detail.

Table 7: Summary of reported factors

Themes	Factors	Frequency (out of 10 interviewees)	
		Positive perception	Negative perception
Presentation-related	Visual details	5	7
	Marked visibility	7	6
	Immersive experience	4	0
	Cognitive fatigue	0	3
Product-related	Genre	6	6
	Length	0	2
Person-related	Viewing habit	1	9

Note. The total number of each row might add up to more than 10 because one participant might cite a factor as both contributing to and detracting from his/her viewing experience.

4.2.1 Presentation-related factors

As the first presentation-related factor, visual details were paradoxically cited by the participants as the reason for which they liked and/or disliked the integrated subtitles. Five participants believed that the integrated subtitles allowed them to capture more visual details. For instance, Daisy (all pseudonyms) explained that "conventionally…you have to quickly switch between the bottom-subtitles and the facial expressions. But with these [integrated] subtitles, I can clearly read the subtitles and also the facial expressions." However, seven participants lamented the possibility of being distracted by the subtitles and thus not paying due attention to the visual details. As Eva put it, "Here, the director clearly foregrounds the lady because the man is in a *bokeh* [blurry] depth-of-view. But when the subtitles appear next to the man, since he is talking, my attention is drawn to him, rather than the lady."

A second presentation-related factor is marked visibility. Integrated subtitles were positioned around the protagonists, unlike the standard subtitles positioned in the periphery of the visual frame. This marked visibility, as agreed by seven participants, could enable them to "immediately know who is speaking" (Lily). However, six participants pointed out that the marked visibility could do potential harm to the visual effect. For instance, Cindy maintained that the integrated subtitles "are intrusive and might disrupt the visual harmony." This was concurred by Zack: "the subtitles are white but the background is a bit dark…the style of the subtitles is incompatible with the background, and might ruin the filmic atmosphere."

The next presentation-related factor is fairly positive. Four participants appreciated the immersive experience enabled by the integrated subtitles. For instance, John described that "if the scenes are filled with conflicts, the moving subtitles can represent the ups and downs of the plot. This is quite immersive." Similarly, Lily appreciated the strong emotional effects evoked by the integrated subtitles: "the subtitles are like dialogue bubbles, which allow me to

immerse myself in the scenes. If placed at the bottom, the subtitles would be much less vivid, and be like cold, emotionless notes."

The final presentation-related factor is cognitive fatigue, which is negative in nature. Three participants argued that following integrated subtitles could lead to higher cognitive demands and could be exhausting. As John put it, "the dialogues go back and forth [between the protagonists], so the subtitles jump around. This is exhausting and annoying." Gabby also believed that "it is mentally exhausting because you need to search for the subtitles and sometimes you may not find them."

4.2.2 Product-related factors

Two product-related factors emerged in the interviews: film genre and length, reported by six and two participants, respectively. Six participants expressed some interest in integrated subtitles and illustrated the genres that were either suitable or not suitable for integrated subtitles. The reported suitable genres included family dramas, dialogue-heavy films (Maggie, Daisy, Cindy), romance films (Tyler, John), and musicals (Lily). The reportedly unsuitable genres included action-packed films (Tyler, John), sci-fi films with dark colour tones (Maggie), films with intense visual language (Cindy, Lily), and films with a historical or a serious theme (Daisy).

For two participants, the length of scenes influenced their perception of integrated subtitles, with both preferring scenes to be short, if integrated subtitles were used. In Gabby's words, "it might be a distinct feature for short videos. But for an entire film, I would be very exhausted halfway through."

4.2.3 Person-related factors

Importantly, all the participants reported that their viewing habits greatly shaped their perceptions of the integrated subtitles, but for nine participants this was mostly in a negative way. The only instance of a positive perception was provided by Maggie, who had developed a habit of capturing every detail in the subtitles. She preferred the integrated subtitles because they tended to be concise and helped viewers anticipate information that was yet to come:

> Bottom-subtitles have more space and can be long without blocking the visuals as much… [Conversely] it is quite straightforward to have the subtitles next to the protagonists, which requires less mental effort to establish the [image-subtitle] relation...It is my habit to focus on every detail, regardless of whether the detail is useful for the later scenes...When I watch the bottom-subtitles, I usually have to pause and read the subtitles with a massive amount of information. So I appreciate the integrated subtitles because they are concise…and have some information pre-processed.

The remaining nine participants all mentioned that their viewing habits were at odds with the integrated subtitles. As Susan explained, "my habit is to focus my gaze on the areas above the subtitles. When the subtitles are placed around the protagonists, I have to strain myself to look left or right." Interestingly, when re-watching the clips, three participants stated that they held a less negative attitude towards the integrated subtitles. In Lily's words, "Now, I am getting accustomed to the subtitles." By contrast, four participants unequivocally maintained that they were unwilling to try the integrated subtitles due to their existing viewing habits. For instance, Zack asserted that:

> I habitually look for the subtitles at the bottom of the screen. So I have to find where the [integrated] subtitles are. I prefer the standard subtitles, because there

is a learning cost for me to get accustomed to the integrated subtitles. I pay for a film to get entertained, not to get challenged by the subtitles.

Clearly, the participants' viewing habits had a great impact on their perceptions, no matter whether they adopted a positive, less negative, or dismissive attitude towards the integrated subtitles.

5. Discussion

Typically, subtitling quality is contingent upon "form-related and content-related quality issues" (Robert & Remael, 2017, p. 169). In this study, the subtitle content was held constant, but the subtitle presentation formats were different between the control group (standard subtitles) and the experimental group (integrated subtitles). Accordingly, this study formulated four hypotheses regarding the impacts of subtitle position on the participants' comprehension, emotional intensity, self-reported cognitive load, and perception of subtitles. Based on the empirical results, the summary of findings is presented in Table 8. The following paragraphs will discuss the findings relating to the four hypotheses in greater detail.

Table 8: Summary of quantitative results

Hypotheses	Findings
H1. Video comprehension: the experimental group > the control group	Disconfirmed: no significant difference was found between the two groups.
H2. Emotional intensity: the experimental group > the control group	Partially confirmed: the experimental group felt more intense emotions in three instances.
H3. Self-reported cognitive load: the experimental group > the control group	Confirmed.
H4. Perception of subtitles: the experimental group > the control group	Disconfirmed. Perception of subtitles: the experimental group < the control group

The first hypothesis regarding video comprehension was not supported because no significant difference was found between the two groups. This is consistent with Black (2022), who found that viewers' comprehension was not affected by the position of the subtitles, but different from Hong and colleagues (2010), who found that integrated subtitles led to better comprehension. The discrepancy may be explained by the participants involved in these studies. The participants in Hong and colleagues (2010) were hearing-impaired, while the participants in Black (2022) and the current study were hearing viewers. Research has shown that the presence of sound can guide viewers' attention to visual details (Foulsham & Sanderson, 2013; Redmond et al., 2016), which potentially contribute to video comprehension. As such, the convergent findings of Black (2022) and this study seem to show that integrated subtitles vis-à-vis standard subtitles did not improve or impair viewers' comprehension of the film, at least for the hearing participants in these studies.

The second hypothesis was partially supported, although to a lesser rather than a greater extent. The participants, watching the videos with the integrated subtitles, felt happier for the second protagonist in Video 1 and felt more disturbed and surprised for the first protagonist in Video 3 (as shown in Table 4). Other than these, the two groups did not differ in their intensity of emotions felt for the protagonists or felt for themselves after watching the videos. The

result was corroborated by the qualitative finding that four (out of 10) participants cited "immersive experience" as an advantage of the integrated subtitles. In other words, while the immersive experience was indeed appreciated by at least some of the participants, its emotional effect was modest. Another interesting point to note is that although the two groups did not differ in content comprehension, as outlined in the previous paragraph, they differed in terms of three emotional experiences. It has been argued that emotion and cognition are entwined (Koskinen, 2020) and that emotion can impact comprehension (Bohn-Gettler, 2019). As such, one might expect that the two groups differed in both their comprehension and emotional intensity, but this pattern was not borne out in the current study. As the comprehension scores of both groups were fairly high (see Table 3), the author tentatively argues that AVT viewers' emotions do not seem to be affected by comprehension "at least when the comprehension level is generally good" (Perego et al., 2018, p. 151). This may mean that integrated subtitles can potentially contribute to viewers' emotional intensity without detracting from their comprehension.

The third hypothesis was confirmed. Although both groups did not think that the subtitles were cognitively taxing, with averaged self-reported ratings below three out of six, the experimental group did score significantly higher than the control group. This suggested that they expended more cognitive effort on following the integrated subtitles, albeit with small to medium effect sizes (as shown in Table 5). During the interviews, only three participants stated that searching for and following the integrated subtitles sometimes led to cognitive fatigue. Triangulating the quantitative and qualitative results, the author contends that cognitive load may not be a prominent issue for the consumption of integrated subtitles, at least based on the participants' self-reported accounts (see Black, 2022 for a similar observation).

The fourth hypothesis was disconfirmed because the perception ratings of the experimental group were significantly lower than those of the control group, with medium to large effect sizes (as shown in Table 6). This result is in line with Akahori and colleagues (2016), who also found that standard subtitles were preferred. The interviews further revealed that presentation-, product-, and person-related factors were at play. For instance, although the participants realised that the integrated subtitles afforded them more time to focus on some visual details, the subtitles might also paradoxically distract them from other visual details. In addition, the marked visibility of the integrated subtitles, albeit helpful for identifying speakers, might draw unnecessary attention to themselves, which was at odds with "the widespread opinion that the best subtitles are those that viewers do not notice" (Díaz Cintas & Remael, 2021, p. 93; see also Szarkowska et al., 2021). Interestingly, the findings of this study differ from previous observations that participants preferred integrated subtitles over standard subtitles (Fox, 2018) and that they were keen to try integrated subtitles in the future (Brown et al., 2015). The discrepancy may be caused by two factors. First, the users' habits, as identified in the interview data, strongly influenced their attitudes towards integrated subtitles. Different from some non-habitual subtitle users in Brown et al. (2015), the participants in this study were all habitual subtitle users, accustomed to bottom-subtitles. Nine interviewees out of 10 reported that this viewing habit had led to their negative perception of the integrated subtitles. This is in line with Manchón and Orero's (2018) finding about "an overwhelming preference for…subtitles at the bottom of the screen" (p. 278). Second, as a product-related factor, genre may explain the discrepancy. Fox's (2018) main study used a documentary, primarily with scenes showing "the persons being interviewed" (p. 172). By contrast, this study used a romantic

comedy with scenes featuring the protagonists in conversation. Thus, the integrated subtitles might be considered as disruptive to the participants' perception of the dialogic dynamics, as opposed to the "static scenes" of the documentary in Fox's (2018) study (p. 172).

6. Practical implications

The quantitative and qualitative findings of this study may have two meaningful implications for subtitling practices. First, as a person-related factor, viewing habits played a crucial role in users' resistant or reluctant attitudes towards the integrated subtitles. Therefore, if audiovisual practitioners want to promote or introduce integrated subtitles, one useful suggestion is to increase the exposure of integrated subtitles in short videos or selected scenes of longer videos, as pointed out by the participants. This strategy is undergirded by the mere exposure effect: "the process whereby repeated exposure leads to the formation of preferences" (Zajonc, 2001, p. 224). Koskinen (2020) related the mere exposure effect to emotional affinity that may influence audience reception of translation. In fact, during the interviews, three participants stated that they had developed a better attitude towards the integrated subtitles upon re-watching the videos. Despite the small number of participants, it still demonstrates the possibility of reshaping viewers' preference for subtitles through repeated exposure. Future studies could explore the mere exposure effect and find out how many viewing attempts can substantially shape viewers' preferences towards a different subtitling practice (e.g., from standard subtitles to integrated subtitles).

Second, it would be a good idea to offer personalised subtitle options for viewers. On traditional media, personalised subtitles are difficult to deploy, so a one-size-fits-all approach is adopted for subtitle presentation. However, on new media, such as online streaming platforms, with enhanced accessibility features, viewers are given more power to customise their viewing preferences (Manchón & Orero, 2018; Wu & Chen, 2022). For instance, some online streaming platforms allow viewers to adjust the sizes of subtitles. In a similar vein, viewers can be given a choice to switch to integrated subtitles to accommodate their diverse subtitling needs. As reported in Section 4.2.2, depending on product-related factors such as genre and length, some viewers are willing to try integrated subtitles that may contribute to their viewing experience. This resonates with Sanchez's (2015) observation that viewers "would like to be given the option to select the position of subtitles" (p. 142). To make the experience even more personalised, recent attempts have been made to create gaze-adaptive subtitles, the positions of which are adjusted based on viewers' real-time gazes (Kurzhals et al., 2020). Although there may be a cost issue involved with this highly personalised solution, it may still be interesting to explore how far should personalisation go when it comes to the position of subtitles.

7. Conclusion

This study adds to a small but growing body of research that examines audience reception of integrated subtitles as compared to standard subtitles (e.g., Black, 2022; Fox, 2018). Although the mixed-methods design sheds light on the participants' comprehension, emotions, reception, and concomitant shaping

factors, the study limited the participants' control of their viewing experiences for a better experimental validity. However, in a natural, real-life setting, viewers have more control. For instance, they can pause the video to read the subtitles, as Maggie pointed out in Section 4.2.3. They can also re-watch the subtitled scenes that seem confusing or intriguing to them. Thus, future studies could perhaps pursue usability tests and explore how viewers use integrated subtitles vis-à-vis standard subtitles in real-life settings. For instance, viewers can be given a choice to customise their user experience, such as switching back to standard subtitles or comparing integrated and standard subtitles in the middle of the viewing. Although this flexibility makes it difficult to ensure the comparability of different viewing experiences, it is not impossible to do so (e.g., Manchón & Orero, 2018). When experimental validity and ecological validity are balanced, researchers will be able to understand and untangle the diverse range of audience needs and preferences of integrated subtitles.

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Appendix 1. Non-significant results of emotional intensity for Video 0

Emotions	Experimental Group		Control Group		*z*	*p*
	Median	IQR	Median	IQR		
Protagonist 1						
Sad	6	1	6	1	0.000	1.000
Angry	2	2	2	2	-.830	.407
Scared	4	4	4	4	-.619	.536
Disgusted	1	1	1	1	-.316	.752
Disturbed	5	2	5	1	-1.272	.203
Surprised	2	1	1	1	-1.667	.096
Happy	1	1	1	0	-1.561	.118
Moved	1	1	1	1	-.947	.343
Interested	1	0	1	0	-.346	.729
Content	1	1	1	0	-.850	.395
Enjoyable	1	1	1	0	-.638	.524
Excited	1	0	1	0	-1.219	.223
Protagonist 2						
Sad	4	2	4	3	-.298	.766
Angry	2	1	2	1	0.000	1.000
Scared	4	4	3	4	-1.247	.213
Disgusted	1	1	1	1	-1.431	.152
Disturbed	5	1	5	2	-1.463	.143
Surprised	2	3	4	2	-1.419	.156
Happy	1	0	1	0	0.000	1.000
Moved	1	2	1	1	-.024	.981
Interested	1	0	1	0	-.358	.721
Content	1	0	1	0	-.288	.773
Enjoyable	1	0	1	0	-.565	.572
Excited	1	0	1	0	-1.370	.171
After viewing						
Sad	4	2	4	1	-.183	.855
Angry	3	3	3	2	-.697	.486
Scared	2	2	2	2	-.340	.734
Disgusted	2	2	2	2	-.747	.455
Disturbed	2	3	2	3	-.029	.977
Surprised	2	2	2	2	-1.073	.283
Happy	1	0	1	1	-.490	.624
Moved	1	2	1	2	-.134	.894
Interested	1	1	1	1	-.380	.704
Content	1	1	1	1	-.443	.658
Enjoyable	1	1	1	1	-1.017	.309
Excited	1	0	1	1	-.618	.537

Appendix 2. Non-significant results of emotional intensity for Video 1

Emotions	Experimental Group		Control Group		*z*	*p*
	Median	IQR	Median	IQR		
Protagonist 1						
Sad	1	0	1	0	-1.503	.133
Angry	1	0	1	0	-.823	.411
Scared	1	1	1	2	-.774	.439
Disgusted	1	0	1	0	-.660	.509
Disturbed	2	3	3	3	-1.131	.258
Surprised	1	2	2	2	-1.340	.180
Happy	6	1	5	1	-.771	.441
Moved	3	3	3	3	-.710	.478
Interested	5	1	5	1	-.528	.597
Content	5	1	5	1	-.288	.773
Enjoyable	5	1	5	1	-.152	.879
Excited	5	1	5	2	-.015	.988
Protagonist 2						
Sad	1	0	1	0	-.463	.644
Angry	1	0	1	0	-.463	.644
Scared	1	0	1	0	-.705	.481
Disgusted	1	0	1	0	0.000	1.000
Disturbed	1	1	1	1	-.909	.364
Surprised	1	2	2	3	-1.003	.316
Moved	3	2	3	3	-.989	.323
Interest	6	1	5	1	-1.067	.286
Content	5	1	5	1	-.107	.914
Enjoyable	6	1	5	1	-1.534	.125
Excited	5	1	5	1	-.755	.450
After viewing						
Sad	1	0	1	0	-.041	.967
Angry	1	0	1	0	-.041	.967
Scared	1	0	1	0	0.000	1.000
Disgusted	1	0	1	0	-.879	.379
Disturbed	1	0	1	0	-.750	.453
Surprised	1	2	1	1	-.910	.363
Happy	5	1	5	2	-.667	.505
Moved	3	3	3	3	-.253	.801
Interested	5	1	5	2	-1.605	.108
Content	5	2	5	3	-.072	.942
Enjoyable	5	1	5	2	-.320	.749
Excited	4	2	4	2	-.014	.988

Appendix 3. Non-significant results of emotional intensity for Video 2

Emotions	Experimental Group		Control Group		*z*	*p*
	Median	IQR	Median	IQR		
Protagonist 1						
Sad	1	1	1	2	-.438	.662
Angry	6	2	5	2	-1.477	.140
Scared	1	2	1	1	-.618	.537
Disgusted	4	2	3	4	-.661	.509
Disturbed	4	3	4	3	-.689	.491
Surprised	5	1	5	1	-.176	.860
Happy	1	1	1	1	-.035	.972
Moved	1	0	1	0	-.661	.508
Interested	1	1	1	1	-.783	.434
Content	1	1	1	1	-.662	.508
Enjoyable	1	1	1	1	-.356	.722
Excited	1	2	1	1	-.838	.402
Protagonist 2						
Sad	1	0	1	0	-.685	.493
Angry	1	0	1	0	0.000	1.000
Scared	1	0	1	0	-.266	.791
Disgusted	1	1	1	1	-.083	.934
Disturbed	1	1	1	1	-.265	.791
Surprised	1	2	2	3	-.877	.381
Happy	5	2	5	1	-1.524	.127
Moved	2	1	1	2	-.084	.933
Interested	5	0	5	4	-1.086	.277
Content	5	1	4	4	-1.761	.078
Enjoyable	5	1	5	1	-.143	.886
Excited	5	0	5	1	-.820	.412
After viewing						
Sad	1	0	1	0	-.624	.533
Angry	1	1	1	1	-.035	.972
Scared	1	0	1	0	-.613	.540
Disgusted	1	1	1	1	-.165	.869
Disturbed	1	1	1	1	-.904	.366
Surprised	2	2	2	3	-.044	.965
Happy	4	4	4	3	-.240	.811
Moved	1	1	1	1	-.119	.905
Interested	4	1	4	2	-.611	.541
Content	3	3	2	3	-.929	.353
Enjoyable	3	3	2	3	-.673	.501
Excited	3	2	2	3	-1.337	.181

Appendix 4. Non-significant results of emotional intensity for Video 3

Emotions	Experimental Group		Control Group		*z*	*p*
	Median	IQR	Median	IQR		
Protagonist 1						
Sad	3	2	4	3	-.044	.965
Angry	4	2	4	1	-1.203	.229
Scared	4	2	4	3	-1.009	.313
Disgusted	4	2	4	2	-.456	.649
Happy	1	1	1	1	-.338	.736
Moved	1	0	1	1	-.590	.555
Interested	1	1	1	1	-.046	.963
Content	1	0	1	0	-.368	.713
Enjoyable	1	0	1	1	-1.022	.307
Excited	1	1	1	1	-.804	.422
Protagonist 2						
Sad	2	3	2	2	-.391	.696
Angry	2	3	2	2	-.199	.842
Scared	6	1	6	1	-.024	.981
Disgusted	2	2	2	2	-.038	.970
Disturbed	6	1	6	1	-.165	.869
Surprised	5	2	5	2	-.182	.855
Happy	1	3	1	1	-.269	.788
Moved	1	1	1	1	-.335	.738
Interested	1	1	1	1	-.088	.930
Content	1	1	1	0	-.272	.786
Enjoyable	1	0	1	0	-.106	.916
Excited	1	3	1	1	-.134	.894
After viewing						
Sad	1	1	1	1	-.416	.677
Angry	1	2	1	1	-.177	.859
Scared	3	4	2	3	-.938	.348
Disgusted	1	1	1	2	-.150	.881
Disturbed	2	3	2	4	-.126	.900
Surprised	4	4	4	3	-.857	.391
Happy	2	3	2	3	-.877	.381
Moved	1	1	1	1	-.125	.901
Interested	4	3	4	3	-1.128	.259
Content	1	2	2	2	-.629	.530
Enjoyable	2	3	2	3	-.372	.710
Excited	3	3	2	3	-1.126	.260