A Quest for Effective and Inclusive Design of Chinese Characters in Subtitling

Helena Casas-Tost and Sara Rovira-Esteva[1]

Transmedia Catalonia, Departament de Traducció i Interpretació i d'Estudis de l'Àsia
Oriental, Universitat Autònoma de Barcelona

Edifici K, Campus de la UAB, 08193 Cerdanyola del Vallès, Spain

Helena.Casas@uab.cat, Sara.Rovira@uab.cat

Abstract

Research on subtitling has developed rapidly in most Western countries in the last two decades, resulting in a certain consensus about standards. In response to new social and political challenges, in recent years the focus of research has broadened to include the usability and effectiveness of subtitles for all audiences. However, research on subtitling in Chinese-speaking territories is lagging behind, although their audiovisual industry is very powerful and that the rate of citizens with accessibility problems is growing. This paper carries out a literature review that reveals a lack of guidelines regarding appropriate typefaces, size, color, exposition time and number of characters per line, as well as a scarcity of empirical and experimental approaches backing up current practices. At present, the manner information is displayed through subtitles prioritizes attractiveness over its effectiveness. Therefore, they are not inclusive enough, since they do not always meet the needs of particular audiences, such as the elderly, the visually impaired or the deaf or hard of hearing. This article synthesizes and critically reviews the state of the art, highlighting those aspects of Chinese subtitling practices that need further study vis-à-vis establishing guidelines to assure the information they convey is usable and effective for all audiences.

Keywords

Subtitling, Chinese, Standards, Subtitle design, Typography, Legibility, Accessibility.

---

[1]　Both authors are equally responsible for the contents of this paper, since both revised and complemented each other's work via a dialectic process. The order in which our names are presented responds to an agreement to present them in alphabetical order. Corresponding author: Helena.Casas@uab.cat

1. Introduction

Research on audiovisual translation has developed rapidly in most Western countries in the last two decades, which has led to a certain degree of consensus about standards in subtitling in languages with alphabetical writing systems to improve their usability and overall effectiveness. This includes the main parameters of typographic design, such as font type, size, color or number of characters per line. Furthermore, in recent years the focus of research has broadened to meet the needs of particular audiences and thus including accessibility issues in response to new social and political challenges. For example, the Convention on the Rights of Persons with Disabilities (CRPD), adopted by the UN by the end of 2006, intended as a human rights instrument recognizes the importance of accessibility to information and communication to persons with all kinds of disabilities.

As Zhang et al. (2011: 962) put it, "[b]ad design of text not only makes things harder to read but can also cause eye strain and fatigue (…)". Due to new lifestyles the rate of myopia in China has increased dramatically (Aldama 2017), giving raise to new problems related to text legibility that need to be tackled.

However, research on subtitling in Chinese-speaking territories is lagging behind and attracts relatively little attention, despite the fact that their audiovisual industry is very powerful and globalized and that imports of foreign products are also on the rise, while subtitling is crucial for effective communication of verbal messages. Despite the fact that China signed the CRPD as early as 2007, there is an absolute void of studies approaching the issue from the point of view either of accessibility or information design.

As a consequence of the lack of empirical studies on Chinese subtitling, the absence of official subtitling recommendations ensuring to persons with disabilities access to information and communication on an equal basis with others should come as no surprise. In an attempt to move towards certain standardization in Chinese and increase overall awareness on the topic as a human rights issue, this article determines the current situation and practice, identifying those aspects that need to be researched by reviewing the literature published. We hope our findings will help to lay a firm foundation for future research.

2. Subtitling in Chinese-speaking territories

While dubbing is still the most widespread mode of audiovisual translation for foreign films and TV programs in Mainland China, subtitling is the preferred modality in Hong Kong and Taiwan (Cheng 2014: 12-13). However, subtitling is on the increase in Mainland China, as it is becoming more popular along with the growing enthusiasm to learn English and appreciate original soundtracks (Cheng 2014: 12; Lü and Li 2015: 122), especially among young audiences from major cities, which is partly related to the booming

phenomenon of fansubbing (Wang 2015: 207).

Apart from the use of subtitles in interlinguistic translation, intralinguistic translation is also common practice i.e., most domestic audiovisual products are subtitled into Standard Chinese. There might be different reasons explaining this. On the one hand, the fact that there is still a significant percentage of the population with poor reading skills in Standard Chinese, and subtitles are used as a tool to strengthen the relationship between writing and sound. On the other hand, in Greater China there are many languages and Sinitic varieties different from Mandarin. Therefore, the use of subtitles is also a way of helping speakers unfamiliar with the standard pronunciation to understand a given audiovisual product, thus broadening its use among citizens from different linguistic backgrounds or even to help them understand people speaking in different Sinitic varieties. In Taiwan subtitling has been mandatory since December 2009, both as a means to respect linguistic diversity as well as to improve accessibility for the hearing-impaired. Therefore, intralinguistic subtitling in Chinese is used to visually reinforce the information conveyed through the audio channel.

Even though subtitling is so widespread, official guidelines and standards are still lacking in comparison with Western counterparts. Despite underlining the importance of standards (Xu and Tao 1997; Xu 2008; Yang 2012), to date, no specific proposals have been tabled. This is the reason why Chinese TV stations and film and media industries at most follow their own in-house guidelines.

3. Subtitling parameters in Chinese

Chinese, as a morphosyllabic writing system using sinograms as its graphic unit, poses extra difficulties to alphabetization and acquisition of reading skills, as compared to alphabetical writing systems. For this reason, subtitle design in Chinese is even more crucial to foster effective and efficient understanding of the message they transmit. Reading Chinese on the screen with time constraints is a challenge, especially when images are displayed synchronically and the attention of the viewer has to cope with reading images and reading text, even more so for people with cognitive or sensorial disabilities. Therefore, creating easily readable and effective subtitles is an essential consideration when reading time has to be optimized. As with any other written language, there are a number of typographic parameters that need to be taken into account, namely font type, size, color, number of characters per subtitle, and time of exposure.

3.1 Font type

Due to the complexity of Chinese characters, there is not such a wide variety of font types as there is in languages written with the Latin alphabet. Akin to the serif and sans serif of Latin,

Chinese fonts can also be divided in two main styles: heitizi and baitizi. Heitizi is a bit like sans serif, with straight lines without extra ornamentation at the end, while baitizi is similar to serif, with embellishments at the end of strokes, emulating manuscripts written with a Chinese brush pen (see table 1).

Serif	Sans-serif
文心雕龙	**文心雕龙**
font type: SimSun	font type: SimHei

Table 1 Serif versus sans-serif in Chinese characters

However, the most widely used categorization of font types is based on the different calligraphic styles of Chinese characters (mainly lishu 'clerical script', kaishu 'regular script', and xingshu 'handwriting style'), that have evolved throughout the history of Chinese script. When it comes to subtitling audiovisual products, there is no consensus as to the most appropriate font type to use.

Songti, heiti, and kaiti are the three fonts considered to be the most appropriate for general programs, news, drama and documentaries because they are deemed to be elegant, serious, clear, and easy to read and provide a sense of formality (Yan 2004: 72; Ye 2000: 51). For news programs, Wang, Zhang and Li (2002: 57) recommend heiti, songti, and also yuanti. Xing (2008: 55) points out that informative or documentary-style programs normally use heiti or yuanti to give the audience a sense of truthfulness, seriousness, and formality. According to Li and Bo (2005), apart from the use of kaiti the most commonly used font is heiti. Xu and Yuan (2009) found heiti, songti, kaiti, and yuanti, particularly heiti and yuanti, to be the most common fonts in TV dramas and feature shows. These are the same conclusions reached by Zheng (2017: 72) after analyzing a sample of 23 videoclips of six different Chinese TV channels, including news, series, culture, children, and entertainment programs.

Xu and Ye (2001: 45) claim that each font transmits different artistic styles. They argue that since heiti, songti and weiti fonts transmit a sense of formality and impartiality, these are the ones used for subtitles in news programs, while those programs devoted to arts and entertainment use more lively and vivid fonts.

Zhang (2009: 155) also believes that typefaces should be chosen according to the topic,

content and style of particular TV programs. He suggests fonts emulating handwriting should be used for subtitles in opening titles, whilst the fonts in print form, such as songti, heiti, and kaiti are more suitable for the rest. He considers songti to be elegant and serious, which is adequate for solemn and historical themes; heiti looks clear and concise, striking and modern, which is ideal for attracting the attention; and, finally, kaiti is natural and dignified, easy to read, which matches well titles and body texts.

There are authors that also differentiate between the two Chinese orthographies in relation to font. Both Kuo (2014: 90) and Chan (2012) recommend SimSum (a songti type) or SimHei (a heiti type) for simplified characters. However, there are differences as far as traditional orthography is concerned, while the former affirms that ximingti and Microsoft zheng heiti are often used in subtitling, the latter recommends mingliu or two different kaiti fonts (KaiTi and ARStdkaiU30 Medium). Among these, Microsoft zheng heiti is the only sans serif font.

From the perspective of accessibility, Pan and Wang (2013) recommend not to use songti and fangsongti (both serif fonts), since they consider the horizontal stokes in these two typefaces to be too narrow and easily blurred on the screen. They also recommend avoiding fonts which are too ornate, and suggest using heiti, kaiti, weiti, and liti and, in general, fonts that are square-shaped, robust, distinct, neat and easily distinguishable, mixing serif and sans serif fonts without providing empirical data to support their claims.

We need to turn to other disciplines to find studies devoted to the legibility of Chinese typefaces. Although not offering conclusive results, the work by Kwok (2016) is worth mentioning as regards legibility and readability. He conducted an experiment with elderly users to find out the optimal font for medicine labels, which have similar space constrains as subtitles. According to his results, none of the three typefaces analysed (songti, heiti, and kaiti) dominated in the three tests carried out. After an experiment with 18 different Chinese fonts Zhang et al. (2011) concluded that songti style fonts showed lower rate of character recognition. Conversely, fangzheng heiti (sans serif) and fangzheng weibei (special font, neither serif nor sans serif) got the highest legibility on single character display and cause relatively less fatigue and eyestrain. In a study using different serif fonts to determine the optimal size and appropriate font for presenting textual information in Chinese, Cai et al. (2001: 9) affirmed that "character style and number of strokes both have a significant impact on the legibility threshold". They found that mingti was more legible than kaiti and kaiti more legible than the liti style. They also claimed that, since the viewing distance in their experiment was 3438 mm, the results could be applied when presenting Chinese characters on televisions, movie screens, amongst other scenarios (Cai et al. 2001: 16-17).

To conclude, as Kuo (2014: 91-2) denounces in her PhD thesis, "so far no consensus has

been reached on which typeface is easier to read on screen, on whether sans serif typefaces are truly better than serif fonts on the screen, and on whether subtitles written in proportional fonts are faster to read than those written in fixed-width fonts (…).

3.2 Size

The size variable is very complex because it touches upon many different parameters, such as screen resolution, viewing distance, and font type. For example, Huang et al. (2009: 81) alert that the strokes Chinese characters are composed of can become slim when displayed on high-resolution displays, which may influence their readability. Kwok (2016) concludes that size is closely related to typeface to the point that depending on typeface's anatomy the same character in the same size occupies more or less space. For instance, the inwards anatomy of kaiti leaves more white space around characters, so that they are actually smaller. In the case of alphabetical scripts, even though the parameter of size has been researched, there are no conclusive results because different units of measure (dot matrixes, points, pixels) are used, due to the advances of technology. Zhang et al. (2011: 966) point out that although "hinting, antialiasing, and subpixel rendering methods have partially mitigated the legibility problem of serif fonts on screen, the basic constraint of screen resolution —typically 100 pixels per inch or less— and small font size continues to limit their legibility on screen, especially for fast reading".

The literature on size is very scarce for Chinese subtitling and, as Xu (2008: 26) points out, there is an urgent need for standardization. According to Pan and Wang (2013), the size of Chinese characters in sing-along subtitles should range from 32-42 points, while Chan (2012) recommends a maximum of 35 points for standard audiovisual products.

The only study we are aware of carried out from the perspective of accessibility based on empirical research is that by Xu and Yuan (2009: 54-55). They concluded that the font size used in many Chinese programs was too small, and that this variable must be linked to font type in order to establish the minimum size for readability. They tested the readability of subtitles with different fonts and sizes in the laboratory and with optimal distance to the TV set. They found that in a dot matrix of 20x20 some details of characters in songti were lost, but they could still be recognized, whereas in a dot matrix of 16x16 not only were many details lost, but also characters were difficult to recognize. They argue that the same was true for kaiti, xingti, and liti. Heiti and yuanti are widely used because they have relatively thick strokes and are more easily distinguishable in smaller fonts. They also mention that when songti and kaiti are chosen for TV subtitles, they are often used in bold to increase their readability. Although this study does not recommend a specific font size, it does point out typefaces' typographic traits as an interesting variable to be taken into account.

3.3 Color

The color variable is not as controversial as font and size, but our review has revealed that Chinese researchers are concerned about the connection between colors used and the contents of the audiovisual product, far from scholars' working in information design and accessibility main focus. For example, Ye (2000: 51), considers that colors can represent and emphasize different emotions and atmospheres, while Yang (2012) argues that the selection of colors for subtitles should be made according to the contents of the program to produce a harmonious general effect. Some authors go further recommending specific colors for given programs, such as Wang et al. (2002: 57), who suggest using white, blue and yellow for news-related TV programs or Zhang (2009: 155), who believes that red and yellow are appropriate for happy events, such as celebrations, whereas blue and purple are suitable for peaceful scenarios.

As far as frequency of use is concerned, there are no available quantitative data, but according to Yuan (1997: 22) and Wang (2015: 208), white is the most commonly used color, while Xing (2008: 55) states first choices are white, blue and yellow.

There are also accessibility issues behind some of the suggestions made by researchers, although they do not approach the subject explicitly from this perspective. Ye (2000: 51) considers white, which represents subjectivity, reality and accuracy, to be a color highly visible in subtitles; whereas blue, pinkish red and red should be avoided when the screen background has a similar color. Xu and Yuan (2009: 55) suggest avoiding red, blue and yellow in scrolling subtitles, since these colors can easily have a tiring effect on the audience. In addition, they consider blue and purple unsuitable in programs that target a senior audience, as color discrimination decreases with aging. Finally, when referring to the issue of readability, Kuo (2014: 93) mentions the importance of the background and shadowing. She argues that in Chinese-speaking countries the use of black boxes is rarely seen, since the use of a soft shadow or a black outline around the text is preferred. After her empirical analysis, Zheng (2017: 72) concludes that while white and black are the preferred colors for subtitle design in Chinese television, sinograms are often outlined with a different color or displayed with a shadow around them or a dark background.

Generally speaking, the elderly community is occasionally mentioned in the literature, while this is not the case of the visually impaired who, for example, might have problems distinguishing colors, or the deaf or hard of hearing, who would appreciate the use of colors to differentiate speakers.

3.4 Number of lines per subtitle

In alphabetical writings the maximum number of lines per subtitle is usually limited to two. Chinese subtitles tend to be limited to one line to avoid them interfering with appreciating what is on screen (Jin 2007). However, two-liners have become acceptable recently, depending on various factors. If there are different languages involved, the upper line corresponds to the language of the original soundtrack, while the translation into Chinese appears in the line bellow (Li and Bo 2005). Zheng (2017: 51) reports the use of a second line for pinyin, the official transcription for sinograms. Other authors relate this variable to geographical areas. Wang (2013: 40) mentions that both in Hong Kong and China subtitles are mainly one-liners, but that two-liners are also permitted. Kuo (2014: 90) states that in Hong Kong the tendency is to use only one-liners, while in Taiwan the trend has been changing recently towards the acceptance of two-liners, and in Mainland China the most common is to use both one and two-liners, although three-liners are also sometimes acceptable.

3.5 Number of Chinese characters per subtitle

The maximum number of Chinese characters per subtitle varies greatly from one author to another. Zhang (2009: 55) mentions a figure of approximately 10 Chinese characters per line. Both Au (1991: 337) and Lü (2007: 20, as cited in Xiao 2012: 46) consider Chinese subtitles should be restricted to one line and each line should not exceed 13 Chinese characters. According to Pan and Wang (2013) the maximum number of Chinese characters per line in the Chinese Central Television news programs is 14. In the same line, Chan (2012) recommends a maximum of 14 sinograms per line. Fong (2009: 94) and Wang (2015: 208) claim that the norm is 15 characters for only one line. Li and Bo（2005）argue that the maximum number of Chinese characters per line should range between 11 and 16, very close to the 11-15 range suggested by Huang (2006: 27). Zheng (2017: 72) concluded that the subtitles analyzed in her sample were mainly one-liners and ranged between 14 and 16 sinograms.

There seem to be differences depending on the geographical area. For instance, Wang (2013: 40) affirms that subtitles in Taiwan are in general 11-16 sinograms long, in Hong Kong they range between 13 and 15, while in China they are between 11 and 19. According to Kuo (2014: 90), while in Hong Kong the length is up to 15 or 16 characters per line, in Taiwan it hovers between 13 and 14 for one-liners, or 26 and 28 for two-liners; whereas in China there is a wider range, from 12 to 20 characters per line. This difference could be justified by the fact that sinograms in traditional orthography have on average more strokes

and this trait might influence readability.

Kuo (2014: 89-90) also mentions the difference between monospaced fonts and proportional ones. In the case of subtitles written using the Latin alphabet, the use of one typeface or another does make a difference in the number of characters per line. Actually, using proportional typefaces can "increase the number of characters in a given line up to 20% compared to monospaced" (Ivarsson and Carroll, 1998: 44). Professional subtitling in Western languages has thus been moving away from monospaced fonts. However, since Chinese characters are double-byte and squared-shaped and this variable cannot be changed, the use of one type of font or another never means a change in the number of characters per line, since no more characters can be squeezed in without affecting the readability of the subtitle.

3.6 Time of exposure

Time of exposure is closely related to the number of characters per line and audience reading speed. As Kuo (2014: 70-1) points out, the literature on reading speed in Chinese is very thin on the ground and the basic principles used follow those of English subtitling.

It takes the average Chinese reader one minute to read around 200-220 sinograms (Xing 2008: 55; Zhang 2009:157). Therefore, people usually can read from three to five sinograms per second whereas, according to Li and Jin (2007: 174), generally speaking, people can read from six to eight sinograms per second. Since subtitles have no fixed number of characters, they consider three seconds to be enough time for both reading the subtitle and following what is happening on screen. This is also the optimal length of subtitle display according to Yan (2004: 73), Li (2001, as cited in Peng, 2012) and Chan (2012). Finally, both Fong (2009: 94) and Wang (2015: 208) state that the exposure time ranges between three and six seconds. According to the latter, the minimum exposure time for one-word subtitles is one second. This wide range might be due to the time needed to read subtitles of one or two lines, although this variable is not usually explicitly stated in the literature and can be misleading.

Although some authors (Yuan 1997: 22; Zhang 2009: 157) argue that subtitle speed should be set according to the content of the audiovisual product, they do not provide any further information or details on this. Li and Bo (2005: 2) report that one-liners in Chinese television series are shown on screen for two seconds, while approximate reading speed is three seconds, although this can change according to viewers' education and reading skills. They are the only scholars who consider accessibility issues when mentioning that deaf-mutes need four seconds for one-liners, seven for two-liners and from eight to nine seconds for three-liners. In sum, current exposition time might not be long enough to guarantee the information reaches efficiently the deaf and hard of hearing audiences, such as

the growing elderly population, nor people with substandard reading skills, such as children, poorly educated or cognitive impaired citizens.

4. Discussion

This literature review has shown that research on Chinese subtitling is basically descriptive, there are not established standards, and most recommendations are not based on experimental studies. Different authors have different approaches and views on the standards of each of the subtitling parameters. Moreover, no mention is made as to what kind of subtitles they are referring to, whether intra- or interlinguistic, and subtitles for the general public or viewers with disabilities. In other words, the topic of subtitling in Chinese has not yet been approached either from the accessibility point of view or from the perspective of information design or effectiveness of communication.

According to the literature, the most widely used fonts are kaiti, heiti, songti, and yuanti, and aesthetic considerations and the relationship between typefaces and type of TV program seem to be more predominant than objective variables such as readability. In fact, the debate about typographical design to optimize subtitle readability seems to be alien to the Chinese context. As early as the 1990s, authors such as Ivarsson and Carroll (1998: 42) and Karamitroglou (1998: 3) advocated the use of sans serif typefaces to make subtitles legible to most viewers. However, two of the fonts used most in Chinese (songti and kaiti) are serif, so we wonder which criteria should prevail to establish the most suitable font types for Chinese subtitles. The answer is not straightforward, since there are a number of contentious variables, namely the available typefaces in each operating system or software, orthography (traditional or simplified) used, the serif and sans serif distinction, aesthetic traits, screen or image resolution, kind of audience targeted and, finally, the contents of what is being screened. Table 2 illustrates this complexity summarizing the main Chinese font types used in subtitling, both in simplified (SC) and traditional orthography (TC), indicating whether they are serif or sans-serif, and their main aesthetic features and content-related suitability according to the literature.

From our point of view, in order to set guidelines for Chinese subtitles for each orthography, objective considerations should take priority over subjective factors, allowing for readability and optimal graphic design to meet different user needs and guarantee accessibility rights as stated by the CRPD. Further research should be conducted adopting a user-centric methodology focusing on the user experience through experimental studies assessing both the readability of each font and viewers' preferences. After this, aesthetic factors could also be taken into account to offer a more sophisticated approach.

Font type	Example	Serif / Sans-serif	Features	Type of program
Songti (SC)	文心雕龙	serif	elegant, serious, formal	solemn, historical topics
Mingti (TC)	文心雕龍			general programs news
Kaiti (SC)	文心雕龙	serif	natural, dignified, easy to read	titles
Kaiti (TC)	文心雕龍			
Weiti (SC)	文心雕龙	serif	formal	news
Weiti (TC)	文心雕龍			
Heiti (SC)	文心雕龙	sans-serif	clear, concise, modern formal	attracting attention news TV dramas and feature shows informative or documentary-style programs
PingFang (TC)	文心雕龍			
Yuanti (SC)	文心雕龙	sans-serif	truthful, serious, formal	news, TV dramas, feature shows, documentary-style programs
Yuanti (TC)	文心雕龍			

Table 2 Main Chinese typefaces and their features

As far as font size is concerned, the literature is very scarce. The recommended size for Chinese characters ranges between 32 and 42 points, on the one hand, and from 22 to 64 pixels depending on the resolution of the screen, on the other. As in the case of alphabetical writings, there is no consensus about the unit for measuring size, which is partly due to the rapid advances in technology and poses serious methodological problems when it comes to

comparing studies.

Given the lack of conclusive data on this issue, we looked at the current standards for Western languages as a point of reference. The space devoted per subtitle line according to Ivarsson and Carroll (1998: 43) is around 8% of the full image height. The tests carried out by Utray, Ruiz and Moreiro (2010: 67) show that using PAL Standard definition 4:3 screens, the maximum recommended sizes for standard TV screens are Arial Regular 31, Arial Narrow 39, Verdana 28 and Tiresias 30, since the subtitles might not fit the screen if sizes are bigger. Romero-Fresco (2010: 183) tested different fonts and sizes in Spain and found that the preferred option appeared to be Arial 32, followed by Verdana 40 and Verdana 32. Whereas, in the experiments carried out in the United Kingdom size 28 was the unrivalled first choice, followed by 32 and 36, which were deemed too big. Therefore, for alphabetical writings there seems to be a wide range of recommended font sizes, depending on the typeface, and audience preferences according to the country of origin. However, it would make no sense to replicate such an experiment in Chinese because sinograms are squared-shaped and font types are monospaced, which means that Chinese characters occupy the same space on the screen regardless of font type and the number and distribution of strokes.

Research on this topic should necessarily include different kinds of screens since many users now consume audiovisual products in secondary screens with different screen resolution, such as tablets and smartphones, where sinograms' size is scaled-down.

Actually, we believe that in Chinese the distinction between serif and sans serif font types, on the one hand, and white space left around the sinograms due to their design, on the other, could be determining factors as far as size and readability are concerned. As presented in the literature review, fonts such as heiti and yuanti are more easily distinguishable with smaller sizes, than other frequently used fonts. Since these two fonts are sans serif, these findings seem to confirm our claim that to set the optimal size of characters experimental research in Chinese subtitling should preferably test sans serif fonts. It would be worth, though, to include Kwok's (2016) approach combining size and typeface's traits to study their impact on readability and accessibility. Furthermore, such experiments should also take into account that Chinese characters are graphically more complex than the letters of the Latin alphabet and, therefore, need to be bigger to be legible. Needless to say, any study devoted to subtitles should explicitly include information about the software and the operating system used in the creation of the subtitles, the unit of measure, the size and resolution of the screen.

When it comes to color, there is certain consensus mentioning white and yellow as the most frequent, in line with the standards in Western languages. The use of white is justified by the fact that it is produced by a combination of the three primary colors, which make white

characters denser, more luminous, and, therefore, easier to read (Ivarsson and Carroll 1998: 45).

Current research on the use of colors in subtitling focuses on the preferences of the deaf and hard of hearing to identify speakers and to mark their relevance (Romero-Fresco 2015). While, the use of other colors is restricted in the West, in Chinese the use of different colors is acceptable. In fact, some authors recommend choosing the color according to the content of the program, such as blue for news-related programs, red for happy events, or purple for peaceful scenarios. However, there are no data available as to what extent these recommendations have actually been followed and proved to be useful. Taking into account the different use and symbolism of colors in the Chinese context, it would be worth examining whether these studies could also be valid for the deaf and the hard of hearing in China. For example, if Chinese associate certain values and qualities with certain colors, their use for certain characters could potentially influence viewers' perception of their personality. Therefore, any study researching the use of colors in Chinese subtitling should also take into account their denotative value.

The last three variables, i.e. number of characters per line, number of lines and time of exposure, are very closely related. Even though there is no consensus as to how many lines a subtitle should have in Chinese, it seems that there is a general tendency for one-liners. This can be explained by the fact that sinograms are double-byte because they are graphically more complex than Latin letters and need to take up twice as much space on the screen to be legible. Moreover, Chinese tends to be more synthetic and characters carry a bigger semantic load than a letter, which implies that one can usually transmit the same quantity of information with fewer sinograms. e.g. the subtitle in Figure 1 takes 16 characters in English, corresponding to only 5 in Chinese, although they are bigger.

Figure 1 Space used in subtitling by latin characters versus sinograms

The number of sinograms per line ranges from ten to sixteen, and differs from one geographical area to another. However, none of the authors reviewed explains how the optimal number of characters per line has been calculated, nor do they back up their figures with empirical experiments about readability, comprehension and optimal graphic design.

Despite the fact that three seconds seem to be the optimal time of exposure (in line with the six-second rule for Western subtitles), this parameter is not usually contextualized with the characters per line or number of lines variables, nor with the different kinds of screens and audiences. Therefore, with the current state of affairs, elderly people, children, poorly sighted and deaf or hard of hearing viewers might be in disadvantage accessing audiovisual products compared to other user profiles due to inappropriate information design.

Finally, the relationship of all these variables with the content of the audiovisual product mentioned by authors such as Cheng (2012: 28) could also be explored to find out if it should be taken into account. This is especially relevant in the Chinese context, since intralinguistic subtitles are much more common than in the West. Actually, Zheng (2017: 72) discovered that the intralinguistic subtitles used in TV series and cultural or children programs were easy to read and understand, whereas those designed for entertainment programs were much less effective and accessible.

5. Conclusions

The main contribution of this paper is a literature review to provide a clearer understanding of the state of the art for subtitling parameters in Chinese from the perspective of information design. This review has revealed that there is a lack of standards regarding Chinese subtitling, and that most studies are speculative or at greatest descriptive, while experimental research is very scarce.

This article has also pointed out that different Chinese-speaking territories follow different subtitling practices. Since local audiovisual products in Chinese are consumed throughout the Sinosphere, becoming thus translational and more global, we wonder if standards should be global for a pan-Chinese audience or rather localized, taking into account different orthographies and Sinitic varieties. Moreover, according to current practices it seems that user interaction with subtitles is not ideal because a lack of awareness about accessibility issues and, since subtitles are not designed for all, they seem not to be inclusive enough.

In sum, current subtitle design in Chinese presents the information in a way that attractiveness supersedes comprehension, efficiency and overall accessibility. Chinese scholars seem to be more concerned about subjective and aesthetic issues rather than

objective ones more closely related to readability, which should be the priority when setting guidelines to guarantee that the information reaches all kinds of audiences and also that the rights of viewers with special needs are protected. Therefore, research to set up subtitling standards should go further, carrying out both descriptive and experimental studies, not only to table recommendations according to Chinese specificities, but also to guarantee the right to access information to the whole population.

Subtitling is a complex topic, which needs to bridge the gap between research and practice. In this vein, it would also be desirable to have closer collaboration –or at least better communication– between the media industries, subtitlers, and scholars. Last but not least, as the literature review has revealed, this field of study would not only greatly benefit from findings in other disciplines, but also from multi-disciplinary approaches, because it involves a great variety of issues, such as applied linguistics, communication, typography, usability, entertainment, human rights, ergonomics, and information design, which are inextricably interrelated. We hope this study stimulates more research in this area.

6. References

Aldama, Z., 2017, China's myopia epidemic: why a simple solution is being ignored. *South China Morning Post*. Retrieved from http://www.scmp.com/magazines/post-magazine/long-reads/article/2085125/chinas-myopia-epidemic-why-simple-solution-being

Au, K., 1991, Xianggang Dianshi Zimu Fanyi Chutan. In *Fanyi Xin Lunji*, pp. 335–346, Xianggang: Shangwu Yinshuguan.

Cai, D., Chi, C. F., & You, M., 2001, The legibility threshold of Chinese characters in three-type styles. *International Journal of Industrial Ergonomics*, 27(1):9–17. http://doi.org/10.1016/S0169-8141(00)00035-4

Chan, D., 2012, Specs for Chinese subtitles. Unpublished working paper.

Cheng, Y., 2014, Chinese Subtitles of English-language Feature Films in Taiwan: A systematic investigation of solution-types. Australian National University.

Fong, G. C. F., 2009, Let the words Do the Talking: The Nature and Art of Subtitling. In G. C. F. Fong & K. K. L. Au (Eds.), *Dubbing and Subtitling in a World Context*, pp. 91–105, Hong Kong: Hong Kong University Press.

Huang, D. L., Patrick Rau, P. L., & Liu, Y., 2009, Effects of font size, display resolution and task type on reading Chinese fonts from mobile devices. *International Journal of Industrial Ergonomics*, 39(1):81–89. http://doi.org/10.1016/j.ergon.2008.09.004

Huang, L.-L. (黃蘭麗), 2006, A Study on the Translation of Chinese Subtitles. Based on The Film of "Goodbye, Lenin!", *Furen Daxue, Deguoyu Wenxue Xi*. Retrieved from http://handle.ncl.edu.tw/11296/ndltd/22611221243723736487

Ivarsson, J.; Carroll, M., 1998, *Subtitling*. Simrishamn: TransEdit HB.

Jin, F. (金芳), 2007, Dianying Zimu Fanyi Celüe Yanjiu. *US-China Foreign Language*, 5(12).

Karamitroglou, F., 1998, A Proposed Set of Subtitling Standards in Europe. *Translation Journal*, 2(2). Retrieved from http://translationjournal.net/journal/04stndrd.htm

Kuo, S., 2014, Quality in Subtitling. Theory and Professional Reality. Imperial College London.

Kwok, B.S.-H., 2016, "Legibility of Medicine Labels." Information Design Journal 22 (3): 202–220. doi:10.175/idj.22.3.02kwo.

Li, H. (李和庆); Bo, Z. (薄振杰), 2005, Guifan yu Yingshi Zimu. *Zhongguo Keji Fanyi*, 2.

Li, S. (李淑萍); Jin, Y. (靳英龙), 2007, Jianxi Zimu zai Dianshi Zhuanti Jiemu Zhong de Zuoyong. *Jiamusi Daxue Shehui Kexue Xuebao*, 25(4).

Lü, Y.; Li, M., 2015, On the New Features of Online Film and TV Subtitle Translation in China. *International Journal of English Linguistics*, 5(6):122–127.

Pan, Y. (潘玉红); Wang, Y. (王妍), 2013, Dianshi Jiemu Zimu de Guifanxing Wenti. *Gongye Jishu yu Zhiye Jiaoyu. Industrial Technology & Vocational Education*, 11(3).

Peng, D. (彭丹), 2012, Yuanshengban Dianying "Yinyue Zhi Sheng" Zimu Fanyi Yanjiu. *Dianying Wenxue*, 10. Retrieved from http://doc.qkzz.net/article/ed3a036e-387e-486a-aa69-6c294ab27132.htm

Romero-Fresco, P., 2010, D'Artagnan and the Seven Musketeers: Subsordig travels to Europe. In A. Matamala & P. Orero (Eds.), *Listening to Subtitles* (pp. 175–189). Bern: Peter Lang.

Romero-Fresco, P. (Ed.), 2015, *The Reception of Subtitles for the Deaf and Hard-of-Hearing in Europe*. Bern: Peter Lang.

Utray, F.; Ruiz, B.; Moreiro, J. A., 2010, Maximum font size for subtitles in Standard Definition Digital Television: Tests for a font magnifying application. In A. Matamala & P. Orero (Eds.), *Listening to Subtitles*. Bern: Peter Lang.

Wang, D., 2015, Subtitling - From a Chinese perspective. In E. Perego & S. Bruti (Eds.), Subtitling Today: Shapes and their meanings, pp. 203–220, Newcastle upon Tyne: Cambridge Scholar Publishing.

Wang, N. (王娜); Zhang, D. (张德志); Li, X. (李响), 2002, Dianshi Zimu de Xiushi yu Zuoyong. *Dangdai Dianshi*, 9:57–58.

Wang, Y., 2013, Los marcadores conversacionales en el subtitulado del español al chino: análisis de *La mala educación* y *Volver* de Pedro Almodóvar. Universitat Autònoma de Barcelona. Retrieved from http://www.tdx.cat/handle/10803/125655

Xiao, W. (肖维青), 2012, Lun Yingshi Fanyi Kecheng de Jishu Lujin. *Zhongguo Fanyi*,

5:44–47.

Xing, Y.(邢彦辉), 2008, Dianshi Jiemu Sheji de Yuanze. *Tantao yu Zhengming*, 11:54–55.

Xu, X. (许 雄); Tao, Z. (陶智勇), 1997, Zimu Sheji yu Dianshi Yingping Texing. *Dianhua Jiaoyu Yanjiu*, 4.

Xu, X. (徐学波); Ye, D. (叶冬梅), 2001, "Qiuxin" yu "Qiuyi": Tan Dianshi Zimu de Chuangzuo. *Dianshi Zimu. Teji Yu Donghua. Television Caption Effects*, 6(1):44–46.

Xu, Z. (许之民); Yuan, T., 2009, Lun Dianshi Zimu Yingong de "Keshixing". *E-Tansuo yu Zhengming. Exploration & Contention*, 2:54–55.

Xu, Z. (许之民), 2008, Dianshi Zimu Yingyong Xianzhuang de Diaocha yu Duice Fenxi. *Dianshi Zimu. Teji yu Donghua. Television Caption Effects Animation*, 11:22–28.

Yan, S. (阎胜利), 2004, *Danshi Zimu Yunyong Jiqiao Jiantan. Dangdai Dianshi. Contemporary TV*, 3:72–3.

Yang, H. (阳红梅), 2012, Yingshi zuopin zimu yishu biaoxian shi de zuoyong. *Mianyang Shifan Xueyuan Xuebao*, 4.

Ye, Y. (叶永沛), 2000, Dianshi Zimu de Sheji yu Yunyong. Shebei Jishu. *Modern Educational Technology*, 2:50–52.

Yuan, H. (袁洪波), 1997, Dianshi Zimu Yi Zhong Dute de Biaoxian Yuansu. *Dianshi Yanjiu*,12:20–22.

Zhang, B., Li, Y., Suen, C. Y., & Zhang, X., 2011, Discovering legible Chinese typefaces for reading digital documents. In *Proceedings of the International Conference on Document Analysis and Recognition, ICDAR*, 962–966. http://doi.org/10.1109/ICDAR.2011.195

Zhang, X. (张新杰), 2009, Jiantan Dianshi Zimu de Yunyong. *Jinri Nanguo. The South of China Today*, 3:155–157.

Zheng, X., 2017, Estándares de subtitulación de la televisión china: un estudio de caso. https://ddd.uab.cat/record/181750. Facultat de Traducció e Interpretació, Universitat Autònoma de Barcelona.

Acknowledgments