More haste less speed: Edited versus verbatim respoken subtitles

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Abstract

The choice between edited and verbatim subtitles has always been a controversial issue in subtitling for the deaf and hard-of-hearing (SDH). Whereas scholars often support editing, deaf associations tend to demand verbatim subtitles as the only way to have full access to audiovisual programmes. Now that European legislation is making SDH no longer a privilege but a right for all viewers, this demand for verbatim subtitles has also been extended to live programmes. Yet, live subtitles, nowadays mostly produced by speech recognition (respeaking), present a different situation and require a different analysis.

The aim of this article is to provide a description of respoken subtitles, especially with regard to their speed. First of all, an overview is given of the different parties involved in the issue of subtitling speed, followed by a review of the research carried out so far and of the guidelines that have been implemented as a result, with particular focus on the UK. Then, an analysis is presented of ten respoken programmes broadcast by the BBC, providing data regarding the speed of the original soundtrack, the speed of respoken subtitles, the amount of editing carried out and the information lost in this process. The results obtained in this analysis show that verbatim respoken subtitles, at least in the programmes analysed, are rarely produced. It is argued that editing, as currently carried out by respeakers, causes a minimal loss of information, especially as compared to the potential loss of information for viewers reading respoken subtitles at the current speeds.

Keywords: Edited subtitles, live subtitling, respeaking, SDH, speed, verbatim subtitles.

Resumen

La elección entre subtítulos editados y literales siempre ha sido un tema polémico en la subtitulación para sordos (SpS). Mientras que los investigadores defienden a menudo los primeros, las asociaciones de sordos suelen pedir subtítulos literales. Ahora que la SpS ha pasado a ser un derecho de todos, la petición de

subtítulos literales se extiende también a los programas en directo. Sin embargo, estos subtítulos, producidos actualmente mediante reconocimiento de habla (subtitulación rehablada o rehablado), presentan una situación especial y merecen un análisis propio.

El objetivo de este artículo es caracterizar los subtítulos rehablados, sobre todo en cuanto a su velocidad. En primer lugar, se analizan las diferentes partes implicadas en este tema y se repasa la investigación llevada a cabo hasta ahora, incluyendo las normas aplicadas en países como el Reino Unido. A continuación, se incluye un análisis de diez programas subtitulados por rehablado en la BBC, con información sobre la velocidad original del programa, la velocidad de los subtítulos rehablados, el porcentaje de edición de los subtítulos y la cantidad de información perdida en este proceso. Los resultados obtenidos indican que los subtítulos rehablados literales, al menos en estos programas, no son muy comunes. Asimismo, se señala que la edición de estos subtítulos, tal y como la llevan a cabo los rehabladores de estos programas, provoca una pérdida mínima de información, sobre todo si se compara con la cantidad de información que podrían estar perdiendo los espectadores de estos subtítulos a algunas de las velocidades a las que se están mostrando en la actualidad.

Palabras clave: Reconocimiento de habla, rehablado, subtitulación rehablada, subtitulación en directo, subtitulado para sordos, subtítulos editados, subtítulos literales.

1. Introduction

Among the most commonly debated topics of discussion in the subtitling literature, speed has always occupied a privileged position. This may be explained by the fact that it is the speed of subtitles that determines whether they can be verbatim or edited. Fast subtitles can convey every single word of the dialogue whereas slower subtitles typically summarise or condense what is being said. Often considered very important in "standard" subtitling (interlingual subtitling for hearing viewers), this issue becomes critical when applied to subtitling for the deaf and hard of hearing (SDH), hence Ofcom's (2005:11) description of speed as "arguably the key underlying issue behind nearly every important issue" in SDH. As will be explained in the next section, speed in SDH is as much a technical matter as it is economic (broadcasters, service providers), political and ideological (deaf associations). It is also a research topic for scholars, who often try to determine the extent to which different speeds are readable for different groups of viewers.

Having taken a back seat for some years, particularly after the drafting of SDH guidelines in countries such as Spain and the UK, recent developments have brought this issue of speed back to the foreground of debate in this field. Deaf associations have started to put pressure on broadcasters to provide accessible audiovisual material (Neves, 2005). Similarly, the European Union, in the written declaration PE397.891v01-00 issued by the European Parliament on 8 April 2008, urges members to subtitle "all public-service television programs" for the deaf, the hard of hearing and many other groups of viewers who benefit from this service, such as an increasing number of people who resort to SDH as a means of language acquisition. In view of this, some broadcasters have increased dramatically their provision of SDH and, for instance, since April 2008, the BBC subtitles 100% of its programmes. Needless to say, this includes a great deal of live events, which, in the case of the topic discussed in the present article -the speed of subtitles- opens up a completely new perspective. Although some live programmes are still being subtitled by stenographers, most of the live content in the BBC (and in an increasing number of channels) is now subtitled by respeaking. As is explained more in detail in section 5.1, respeaking is a speech-recognition-based technique first used in 2001 and about which very little has been written or researched (Eugeni, 2009). Thus, the question now is not only whether viewers can follow fast, verbatim subtitles, but whether this type of subtitles can actually be produced by respeaking.

The aim of this article is to investigate the issue of speed in relation to SDH produced by respeaking. Before this, a summary of the main views and interests involved in the edited-vs-verbatim debate will be provided, as well as a review of the research carried out so far in this field and the guidelines applied in different countries, with particular focus on the UK.

2. More to speed than meets the eye

As mentioned above, the speed of subtitles is a thorny issue that concerns different parties who hold different views for different reasons. Firstly, broadcasters, under pressure to provide more SDH, support verbatim subtitles, as they require less effort on the part of the subtitlers and are thus more economical than edited subtitles:

> The cost of subtitling a programme relates, in part, to the amount of editing required. Unedited subtitles are faster than edited ones. Reducing the amount of editing required, thereby increasing the speed of text on screen, might assist broadcast licensees to meet the new increased subtitling requirements (Ofcom, 2005:6).

Secondly, and surprisingly, most deaf viewers (or rather deaf associations) also demand verbatim, and therefore faster, subtitles. In this case, the reason is not

financial, but political. There is among these viewers a great deal of sensitivity and antagonism towards the idea of editing, regarded as "a form of censorship and 'denying' deaf people full access to information available to the hearing population" (Ofcom, 2005:17).

Finally, a third group is formed by scholars and researchers, the only ones who usually support edited subtitles. They often agree with Sancho-Aldridge (1996:24), who calls for the need to "disentangle the politically sensitive issue of 'access' from the practical issue of which style, in real terms, provided deaf viewers with most information". Among scholars, there seems to be consensus as to the fact that verbatim subtitles are often too fast to provide full access for many deaf viewers (Neves, 2008). This view is backed by several studies on reading speeds, described in the next section, as well as by the second thoughts expressed on some occasions by deaf viewers when asked to reflect on this issue. A case in point is the study carried out by Sancho-Aldridge and IFF Research Ltd (1996:24):

> Initially, over half (54%) the respondents said they wanted word-for-word subtitles, while 33% opted for summarised (13% had no preference). When respondents were asked to consider the practical difficulties of reading word-for-word subtitles, however, 10% fewer chose them, resulting in an even division between the two methods – word-for-word (45%) versus summary (43%).

Yet, even though it may be true that the wider deaf audience may appreciate the benefits of editing when considered more fully, the reality is that the "official" stance of deaf associations is to push for verbatim/fast subtitles, thus forming an unlikely partnership with broadcasters. As a result, the paradox remains that whereas scholars support editing to provide full access for the deaf, the latter line up with broadcasters to push for verbatim, which may not give them full access after all.

The next two sections present a review of the most relevant research carried out to date on this issue and an overview of the guidelines that have been implemented in the UK on the basis of such research.

3. Research on speed

First of all, it is important to differentiate between at least three different types of speed: speech rate, reading rate and respeaking rate. Given that speech and reading rate are typically given in words per minute (wpm), this is the unit that will be used throughout this article. When necessary, however, the equivalent in characters per second (cps) will be provided, as this is commonly used to evaluate

subtitling speed. This will apply mainly to the English language, where the average word is considered to have five characters (Díaz-Cintas, 2008:97)

Out of the three above-mentioned types of speed, respeaking rate is still to be investigated, but scholars have already looked into the first two, especially in the field of psychology and psycholinguistics.

As for speech rate, a further distinction is to be made between extemporaneous speech and televised speech. Early studies such as the one carried out by Kelly and Steer (1949) set spontaneous speech in English at 159 wpm. Although this figure is to be taken with some reservation given the countless factors that can affect spontaneous speech rate, it has been later on confirmed by Steinfield (1999), who points to 160 wpm, and by Wingfield et al. (2006), who suggest 140-160 wpm. Televised speech presents a different situation. As noted by Uglova and Shevchenko (2005), who compare the speed of spontaneous and televised speech in different American cities, the average speech-to-pause ratio in spontaneous speech is 3:1, that is, there is 1 pause every 3 seconds. In the news, this changes to 14:1, i.e. 1 pause every 14 seconds. Given this decrease in the number of pauses and a typically faster delivery, Uglova and Shevchenko (2005) set televised speech in US news programmes at 200 wpm, and even faster in weather forecasts, which is corroborated by Wingfield et al. (2006). In the case of the UK, Lambourne (2006) points to a slightly slower average delivery of 180 wpm, although further data is needed to corroborate this. In any case, it would appear that televised speech is usually faster than spontaneous speech. Given the widely held notion, especially among psychologists, that an individual can usually hear and digest acoustic information more quickly than they can read it, the question now remains of whether viewers can read subtitles displayed at such speed.

In this case, and even more than in that of speech rate, figures on reading speed must be taken with a pinch of salt:

> An individual's reading rate does not appear confined to one static quantitative point on a numerical scale. Instead it appears dependent on several variables including the reading level of the materials, intended purpose of the reading, and conceptual context of the material. The most important factor to be considered in exploring any of these variables is the accuracy or efficiency of comprehension (Carver, 1974).

Apart from the factors mentioned by Carver, it is essential to take into account the different type of readers/viewers, especially when dealing with SDH:

> Even among groups of hearing subjects, one finds considerable differences in reading speeds. These differences, though, are particularly relevant within the deaf community, which is known to be very heterogeneous, with outlooks and needs so different that it is difficult to adequately meet them all together (de Linde and Kay, 1999:11).

Although the limited scope of this article does not allow a great deal of hair-splitting, distinctions must be made at least in terms of readers (hearing/deaf adults) and material (print/subtitles).

First of all, as far as hearing adults are concerned, Samuels and Dahl (1975) find their average speed reading print to be 291 wpm (461 wpm if it is only an overview of a text). Similarly, Carver (1976) suggests a range from 315 to 200 wpm as the difficulty level of the reading material increases. These figures are ratified by D'Ydewalle and de Bruycker's (2007) eye-tracking-based data: 300-240 wpm. As for subtitles, it must be said that not many studies have been carried out on hearing adults' reading speed. Apart from the one conducted by Jensema (1998), who includes hearing participants but is mainly intended for deaf and hard of hearing viewers, the most important one is the one undertaken by D'Ydewalle et al. (1987). Using eye-tracking technology, he tested three different presentation times for subtitles: two lines of 32 characters in 4 seconds (approximately 192 wpm), 6 seconds (130 wpm) and 8 seconds (96 wpm) respectively. The object of this study was to ascertain if the six-second rule (a full two-line subtitle displayed on screen for 6 seconds and shorter subtitles scheduled proportionally), accepted as common practice in most subtitling countries, could be validated by empirical research on reading speed. His results leave little room for doubt, the six-second rule being identified as setting the appropriate reading speed for the participants. This rule has later on been supported by other scholars such as Díaz Cintas (2003), who applies it to longer lines than the ones referred to by D'Ydewalle (72 characters instead of 64), thus setting the recommended speed at 144 wpm (12 cps).

As for deaf and hard of hearing viewers, the first problem comes from the impossibility to refer to them as one homogeneous group. As pointed out by Neves (2008:143), an important distinction is to be made between the deaf, that is, "people who are deaf but who belong to the social context of the hearing majority and relate to the oral language as their mother tongue", and the Deaf, "a social and linguistic minority, who use a sign language as their mother tongue and read the national language as a second language". Given that the focus of this article is on the subtitles and not on the audience, the term deaf will be applied to both groups and distinctions between the two groups will only be made explicit when necessary. In any case, if the focus is placed on what Neves (2008:143) refers to as Deaf viewers, it is paramount to bear in mind Torres and Santana's (2005) caveat that

> [f]or deaf people, reading presents some added difficulties to those faced by hearing people. The deaf tend to have less language-specific knowledge (semantic and syntax), as well as less of the oral skills necessary for reading (i.e. phonological processing). Further, the encyclopedic language knowledge necessary to understand texts is poor.

It is for this reason that, as shown by both Conrad (1977) and Torres and Santana (2005), the reading level of deaf high school students corresponds to that of hearing students who are seven years younger.

With regard to subtitles, the situation is similar to that of the literature on hearing viewers –not enough investigation has been conducted. The most relevant study is probably the one carried out by Jensema (1998), who tested different subtitle speeds (96-200 wpm) with 205 deaf, 110 hard of hearing and 262 hearing participants. Results indicated that for most viewers 145 wpm was the preferred speed and that anything over 170 wpm was generally deemed as too high. The question is now whether, ten years later, viewers' reading speed has increased:

> (…) subtitles have been around for the past twenty-three years and, therefore, it could be argued that users are much more accustomed to reading them. It is likely that this familiarity has assisted greater reading speeds, particularly as users are probably already coping with speeds of 160 words per minute on a regular basis (Ofcom, 2005:6).

In the light of the different attempts to increase reading speed on the part of the industry, scholars have tried to set limits and top speeds over which comprehension would suffer. Thus, Santiago-Araújo (2004) and Neves (2005) warn, on the basis of their research, that subtitles displayed at 180 wpm (15cps) or faster, even with careful line breaks and synchrony with image, pose a great deal of difficulties for deaf (and even some hard-of-hearing) viewers.

The next section will focus precisely on the audiovisual industry, its take on this issue and how the above-mentioned research has been incorporated or disregarded in the relevant subtitling guidelines, particularly in the UK.

4. Guidelines and regulations

Table 1 shows some of the speed-related information (number of characters, lines and speed) as included in the SDH guidelines of different countries:

Table 1. Speed-related information in SDH guidelines (Arnáiz Uzquiza 2008)

	UK	Spain	Ireland	Belgium	US	Canada	Australia
Characters	32/34	35/37			32		
Lines	1/2/ (3)	1/2/ (3)	1/2/ (3)	1/2/ (3)	2	1/2/ (3)	1/2/ (3)
Speed	up to 180	192	160/180	140/160	120/235	200	180

In the particular case of the UK, the Independent Television Commission (ITC) laid down in 1999 a set of standards for subtitling pointing out that the presentation rate for pre-recorded programmes "should not normally exceed 140

words per minute" (1999:11). A higher rate of 180 wpm was also permitted in exceptional circumstances, such as add-ons. This recommended speed of 140 wpm coincides with the above-mentioned findings by Jensema (1998) and has been later on ratified by the European Broadcasting Union (EBU), which also advocates 140 wpm and up to 200 wpm for live subtitling on the following grounds:

> Research shows that reading on a computer screen may be 20-30 % slower than reading printed text. On a TV screen, reading might be even slower. The 'safe area', the lower resolution and longer viewing distance makes the image size on the retina much smaller than when looking at a computer or at the cinema. In watching TV there is also a lot more for the brain to absorb than just the subtitles. The image is just as important, or more important, than the dialogue. Therefore it is crucial that subtitles are displayed for a sufficient length of time for viewers to read them (EBU, 2004:21).

However, as explained above, broadcasters have started to point out that by now the audience are likely to have become accustomed to reading subtitles, thus being able to "cope with shorter display times" (EBU, 2004:21). Following this, the Office of Communications (Ofcom) put forward in 2005 its report *Subtitling –An issue of speed?* aimed at revisiting the standards set by ITC six years earlier. This report was based on a study carried out with 64 participants: 21 moderately deaf, 21 severely deaf and 22 profoundly deaf, all of whom were also sorted in groups on the basis of their age and literacy level. They were shown different clips subtitled at three different speeds and were asked about the information obtained and the extent to which they felt comfortable reading the subtitles. Interestingly, there seems to be a certain mismatch between the findings obtained in this research and the final recommendation made by Ofcom. The following excerpts are included throughout the report:

- On subtitling speed in general:

- "While many people may be able to read faster subtitles, they do not necessarily want very fast subtitles on a day-to-day basis when they are watching television for leisure reasons" (2005:4-5);
- "Any increase in speed potentially will alienate a proportion of deaf viewers" (2005:4).

- On clips subtitled at 180 wpm, as opposed to the usual 140 wpm:

- "Almost 40% thought that current subtitling as depicted by these examples [180 wpm] were too fast" (2005:4);
- "If forced to choose between whether the speed of each clip was too fast or too

slow, viewers across all groups were significantly more likely to believe that the speed of the clip was 'a bit too fast'" (2005:4).

- And finally, by way of conclusion:

- "The majority of participants do not view increasing subtitling speed as necessary; indeed they feel they are, if anything, too fast" (2005:28);
- The majority of deaf viewers would like subtitle speed to stay the same" (2005:4).

On the basis of these findings, it is pointed out that "communicating an increase in speed as a benefit to the consumer might be viewed with scepticism, as it may even be viewed as a benefit to the provider" (2005:28). Yet, Ofcom's final recommendation is that subtitling speed "should not normally exceed 180 wpm [15 cps]" (2005:5), effectively allowing broadcasters to increase up to 40 wpm the previous recommended subtitling rate.

Following on the study carried out for this report, Ofcom proposed new guidelines on access services in its *Television Access Services – Review of the Code and guidance* in 2006. Disability organisations, broadcasters and access service providers were asked to comment on this revision, which included the proposal for an increase in subtitling speed from 140 to 160-180 wpm (15 cps). As stated in this report, there was broad consensus among all the parties that "the suggested range of maximum speeds struck a reasonable balance" (2006:9), which led Ofcom to recommend 160-180 wpm given that it attracted "little adverse comment". Yet, it is worth noting here that important organisations such as Sense, Tag, the Royal National Institute for the Blind and the Royal National Institute for the Deaf regarded these speeds as too fast and likely to pose problems to some viewers.

In other words, 180 wpm (15 cps), the maximum subtitling speed set by the UK guidelines, has been agreed upon with consensus among broadcasters, service providers and some deaf associations, but is seen as somewhat excessive among most academics and many viewers. Crucially, neither the previous ITC guidelines nor the current Ofcom ones make a provision for the speed of live subtitles, which are now extremely recurrent (the BBC alone subtitles 20,000 hours a year by respeaking) and which may pose an added difficulty in terms of reading, as they are displayed in scrolling (word-for-word) mode. Research is thus needed into this new type of subtitles to find out, first of all, what they are like (verbatim or edited, how fast, etc.) and secondly how they are read. The next section tackles the first of these two points with an analysis of a number of BBC programmes subtitled by respeaking.

5. Analysis of respoken subtitles

5.1. Overview of respeaking

Before delving into this section, it is important to provide a brief overview of the respeaking technique and what it entails, which will hopefully help to interpret the results obtained in the present analysis. As mentioned in the introduction, the need, imposed by European and national legislation, to provide live SDH has led most broadcasters to rule out typing (not fast enough) and stenotyping (too expensive, as it requires three-year training) in favour of respeaking. In this technique, a subtitler listens to the original soundtrack of a live programme and respeaks it (repeats it or reformulates it, depending on whether it is possible to keep up with the original speech rate), including punctuation marks, to a speech recognition software, which turns the recognised utterances into subtitles displayed on the screen with minimum delay. An utterance like "Good morning, ladies and gentlemen." would thus be respoken live as "good morning, comma, ladies and gentlemen, full stop". Given that respeaking is nowadays mainly used for intralingual SDH, respeakers must include extra-linguistic information such as [Crowd chearing] or [Booing]. The identification of characters and the management of the subtitle position, essential for SDH viewers, are usually done manually with the help of a small keypad.

Although both researchers and trainers have taken their time to wake up to this new reality, which explains why broadcasters and service providers have to train their own professionals, some scholars are beginning to look into what respeaking is (Eugeni, 2006), what skills are needed (Remael and van der Veert, 2006; Arumí Ribas and Romero-Fresco, 2008) and how respoken subtitles are received (Romero-Fresco, forthcoming). It could be argued that, in many ways, respeaking is to subtitling what interpreting is to translation, namely a leap from the written into the oral without the safety net provided by time. When describing this technique, though, a difference may be drawn between the process and the product (Romero-Fresco, 2009). As a process, respeaking may be regarded as a kind of intralingual simultaneous interpreting with the addition of punctuation marks; as a product, it entails the production of non-synchronous subtitles (there is usually a 3-4 second delay) which are usually expected to reformulate or transcribe what is being said by the speaker/s. Respeakers thus need to draw on and be equipped with interpreting and subtitling skills (especially regarding SDH), as well as skills related to the use of (speech-recognition) technology.

In any case, much more research on training and on the nature of respoken subtitles is needed to inform both practitioners and those drawing up the relevant guidelines. As far as the latter are concerned, any decision on the speed of subtitles

in general must take into account the particular speed of respoken subtitles, which has so far been overlooked and which is tackled in the following study.

5.2. The case-study

The present study aims to explore different issues related to the speed of respoken subtitles as produced by Red Bee Media and broadcast live by the BBC in 2008.

The ten programmes analysed here have been sorted according to their genre: sports, news and interviews/weather reports. They thus range from the easiest to the most difficult one to respeak on the basis of the original speech rate (Marsh, 2006). In total, ten five-minute clips have been analysed, that is, a total amount of 250 subtitles. The sports clips analysed have been extracted from the BBC One live coverage of the Olympics in Beijing on 18/08/08; the news clips, from BBC News at One (BBC One, 3/10/08); and the interviews, from Newsnight (BBC Two, 23/09/08).

5.2.1. ST and TT speed

The results of the analysis are shown in table 2, which includes the genre and number of the programmes analysed (whether sports [spt.], news [nws.] or interview/weather [int./wea.]), the number of speakers (sps), the speed of the original soundtrack (ST), the speed of respoken subtitles (TT) and the difference in speed between ST and TT (diff.):

Table 2. ST and TT speed in the programmes analysed

	Spt1	Spt2	Spt3	Spt4	Nws1	Nws2	Nws3	Int1	Int2	Wea1
Sp's	1	1	1	2	1	1	1	3	2	1
ST	124	147	176	182	161	178	198	211	245	232
TT	106	120	160	140	146	143	161	190	188	173
Diff.	- 18	-27	-16	- 42	-15	- 16	-37	-22	-57	-59

First of all, it should be noted that the clips analysed in the ten programmes correspond to "fully spoken" excerpts. In other words, they do not include parts where, for different reasons (credits, gaps between sections), there are large pauses. Had the analysis been carried out for the full duration of the programmes, which would far exceed the scope of the qualitative and quantitative analysis included in this article, ST and TT speed would be considerably lower, given the existence of these pauses. As a matter of fact, data provided by Red Bee Media shows that the average TT speed of a 15-minute section of sports is somewhere between 66.6 and

100 wpm, depending on whether it is a commentary or play, and that the TT speed for news is 133 wpm. Yet, from the point of view of reading respoken subtitles, it is more relevant to deal with "fully spoken" excerpts, as the speed found there will be the speed faced by viewers at a given time.

As far as ST speed is concerned, there seems to be an increase from sports to news and finally to interviews/weather. Thus, in the programmes analysed, sports are spoken at an average of 157 wpm, ranging from 124 wpm to 182 wpm (the latter featuring several speakers). News are spoken at an average of 180 wpm, thus confirming what was noted by Lambourne (2006), and range from 161 wpm to 198 wpm. Finally, interviews and weather reports feature the fastest speech rates, with an average of 230 wpm and ranging from 211 wpm to 245 wpm. As for the rate of respoken subtitles (TT speed), the average found is 131 wpm for sports (106-160), 154 wpm for news (146-161) and 184 wpm for interviews and weather (173-190). Graph 1 shows a comparison between ST and TT speed:

Graph 1. ST speed and TT speed
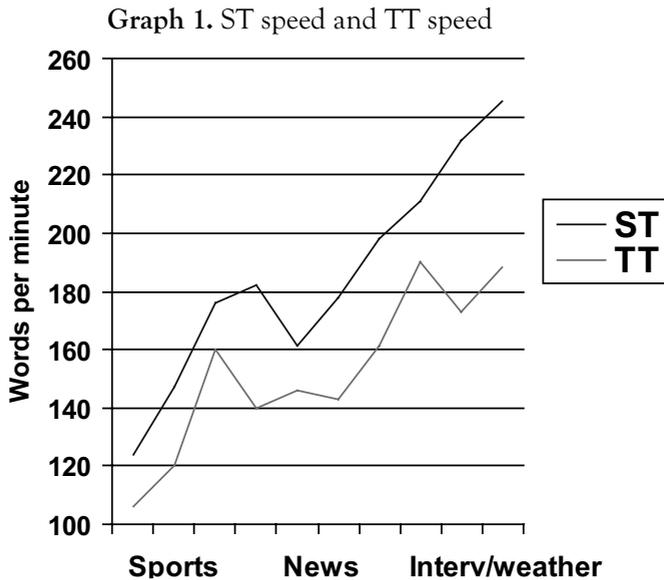
As can be seen here, respeakers seem to lag behind the original speaker on a general basis, which means that they do not really produce verbatim subtitles, even if they are advised to do so (Marsh, 2006). The difference between ST and TT speed is, on average, 16.3% in sports, 12.7% in news and 20% in interviews and weather. In other words, respeakers are uttering 25 fewer words per minute than the ST speaker in sports, 22.7 in news and 46 in interviews and weather reports. In view of these data, the question arises of why, if respeakers can produce up to 190

wpm (see Nws1), they still lag behind a sports commentator who speaks at only 124 wpm (see Spt1). If they are asked to produce verbatim subtitles, why do they not do so in these programmes where the slow ST rate makes it technically possible?

The answer to these questions may lie in punctuation. As shown in table 3, in the same way that respeakers fall 25 (sports), 22.7 (news) and 46 (interviews and weather) wpm short of covering the original ST speed, they are also uttering 20 (sports), 17.3 (news) and 22.3 (interviews and weather) extra words in punctuation marks (mainly "full stop", pronounced as one word, and "comma"):

Table 3. Punctuation in the programmes analysed

	Spt1	Spt2	Spt3	Spt4	Nws1	Nws2	Nws3	Int1	Int2	Wea1
Sp's	1	1	1	2	1	1	1	3	2	1
ST	124	147	176	182	161	178	198	211	245	232
TT	106	120	160	140	146	143	161	190	188	173
Diff.	- 18	-27	-16	- 42	-15	- 16	-37	-22	-57	-59
Signs	16	20	17	24	15	19	18	26	20	21
Signs %	15%	15.8%	10.6%	17%	11%	15.3%	12%	13.6%	10.6%	11.2%

In news and sports, for example, respeakers may be uttering 14.5 % fewer words than the original soundtrack, but they are also adding 13.7% in punctuation marks. Thus, if we consider punctuation marks as words, the comparative graphic of ST and TT speed changes considerably:

Graph 2. ST speed and TT speed including punctuation marks
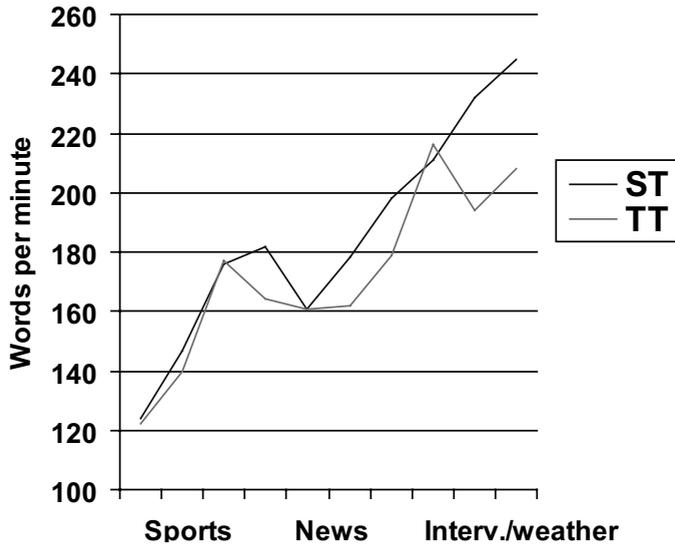
So, to answer the questions posed above and judging by the clips analysed here, it would appear that respeakers adapt their speed to that of the ST speakers, thus uttering, whenever possible (under 180 wpm, that is, for most sports and some news), a very similar number of wpm to the ST. The problem is that punctuation marks are also (probably unconsciously) included as words, which means that, even when verbatim subtitling would be possible, respeakers still lag behind and thus edit an average of 20-25 words in sports and news and 46 in interviews/weather reports. To produce verbatim respoken subtitles in sports and news, respeakers would have to speak 20-25 wpm faster than the original speakers.

Another issue that is worth highlighting is that of the maximum respeaking speed. As explained in sections 3 and 4, subtitling speeds of or over 180 wpm are deemed as too fast by most academics and many viewers. Despite the fact that the maximum speed usually calculated for the use of speech recognition software such as *Dragon Naturally Speaking* is 160 wpm and that the respeaking world record set by Fabrizio G. Verruso in the conference *Intersteno* 2005 is 174 wpm, respeakers at the BBC seem to reach up to 190 wpm in fast programmes. To what extent are these respoken subtitles readable for the viewers? Possible answers to this question are explored in the next section.

5.2.2. Segmentation and reading patterns in respoken subtitles

First of all, it is essential to look at the specificities of respoken subtitles. Due to the nature of this technique, respeakers cannot afford to control segmentation in their subtitles. Words are displayed one by one on the screen as they are uttered by the respeaker, who cannot break subtitled lines (when a sentence continues over a new line) "to coincide with sense blocks" (Díaz Cintas, 2008:100), as is often recommended in pre-recorded subtitling. This carries important implications from the point of view of reading. As pointed out by Perego (2008:35), appropriate line segmentation is critical, given that "only in this way can the cognitive process of reading the subtitles and watching the action proceed with the least effort". In Perego's view, this is particularly relevant in situations where viewers are under pressure, which may perfectly apply to live programmes such as the ones analysed in this article. As a matter of fact, eye-tracking-based research carried out by D'Ydewalle et al. (1989:42) has shown that unusual line-splitting "increases considerably the time in the subtitled area" for most viewers.

In order to examine how segmentation has been carried out in the programmes analysed here, the first step is to ascertain the average length of the sentences used in the subtitles of every programme (St Ln) and the average number of words that fit in a subtitled line (WpL). This is included in table 4, which also incorpo-

rates a percentage of the subtitles that have an appropriate segmentation (Good Seg.), based on the criteria established by Perego (2008):

Table 4. Data on segmentation in the programmes analysed

	Spt1	Spt2	Spt3	Spt4	Nws1	Nws2	Nws3	Int1	Int2	Wea1
Sp's	1	1	1	2	1	1	1	3	2	1
ST	124	147	176	182	161	178	198	211	245	232
TT	106	120	160	140	146	143	161	190	188	173
Diff.	- 18	-27	-16	- 42	-15	- 16	-37	-22	-57	-59
WpL	5.8	5.8	5.8	6	5.73	5.75	6.3	6.1	6.6	6.1
St Ln	8.4	9.6	11.3	10.1	12.3	15	14	14.6	14.3	11.7
Good Seg.	35%	25%	27%	36%	30%	12%	25%	20%	32%	40%

As shown in this table, the average sentence length is 12.13 words and the average number of words per line is 6. Considering that sentences do not necessarily start at the beginning of a subtitle, it then follows that most sentences in respoken subtitles run across three lines, that is, they feature two line breaks. Most importantly, judging by the results obtained in this analysis, in 71.8% of the cases, the segmentation in these two line breaks is poor and is thus likely to cause a slower and more difficult reading process, such as in pictures 1 and 2:

Picture 1

Picture 2

To explain this reading process, it is important to understand how subtitles (especially scrolling subtitles) are processed by the viewers. According to Jensema et al. (2000:284), who explored the main viewing patterns of subtitles with eye-tracking technology:

When captions are present, there appears to be a general tendency to start by looking at the middle of the screen and then moving the gaze to the beginning of a caption within a fraction of a second. Viewers read the caption and then glance at the video action after they finish reading.

It should be highlighted that, rather than moving smoothly across the page/screen, our eyes focus on specific parts and then jump across words and images. The pauses when the eyes remain still for about 0.25 seconds are known as *fixations*; the jumps between fixations are known as *saccades*, which take as little as 0.1 seconds and are the fastest movement the human being is capable of making (Rayner and Pollatsek, 1989). When reading a subtitle, the eyes need not fixate on every word. One fixation may suffice to read more than one word and predictable words are often skipped, which allows faster reading. In the following pictures, for example, the viewer manages to read the subtitled line in four fixations (picture 3). There has been no need to fixate on the words "students" or "hear" because they can be seen with peripheral vision and guessed by the context, particularly by the preceding words, "deaf" and "can't". This is essential when watching subtitles, as it enables the viewer to turn quickly to the image (picture 4):

Picture 3   **Picture 4**

An important point to be mentioned here is that Jensema et al.'s (2000) research was carried out with block subtitles, whose reading process may be different to that of respoken subtitles displayed in scrolling mode. The combination of their findings and the results obtained in the present article so far allows, however, for the anticipation of some hypotheses. If, as happens in general in subtitling, viewers start off focusing on the subtitles, they are, in the case of scrolling subtitles, very likely to focus on every word as they come out one by one. This would be in line with D'Ydewalle et al.'s (1991) finding that the viewers' sight is almost inevitably drawn to the subtitles even when they do not understand the language they are in.

Most importantly, this may be expected to slow down the reading speed considerably, as viewers would then fixate on every word without taking advantage of the peripheral vision or the "guessing process" described above. If, on the other hand, viewers decided to turn their attention to the images, the scrolling words would still be appearing on the screen. According to the data included above, after only two seconds (at a speed of 180wpm), six words would be displayed, so when the viewers look back at the subtitle, a new line will have been created. As has been said, in over 70% of the cases this line will have been poorly segmented, thus adding further difficulty to read the subtitles. In any case, this hypothesis needs to be tested with an eye-tracking-based analysis of reading patterns in scrolling subtitles, which constitutes the scope of a further piece of research (Romero-Fresco, forthcoming).

5.2.3. Editing and information loss in respoken subtitles

As pointed out in the introduction, many deaf viewers equate editing to censorship and therefore support verbatim subtitles, regardless of their speed, as the only method to provide them with full access to the original content. The analysis presented here has shown that, at least in these programmes, verbatim respoken subtitles are not an option, given that respeakers seem to lag between 20 (sports and news) and 40 (interviews and weather) wpm behind their original speakers. The question is now how much information is lost in this editing process and how the loss can be quantified.

A useful notion in this case is that of "idea units", which is often applied to the analysis of speech and, more relevantly, it is used by the ITC Guidance for Real-time Subtitling (1999). Coined by Chafe (1980), this notion refers to the spurts in which speech is often produced. Chafe (1985:106) defines them as "units of intonational and semantic closure", which can be identified by the following criteria:

- They are spoken with a single coherent intonation contour, ending in what is perceived as a clause-final intonation;
- They are preceded and followed by some kind of hesitation, ranging from a momentary break in timing to a filled or unfilled pause lasting several seconds;
- They are clauses -that is, they contain one verb phrase along with whatever noun phrases, prepositional phrases, adverbs, and so on are appropriate;
- They are about seven words long and take about two seconds to produce.

Somewhat vaguely, the ITC Guidance for Real-time Subtitling (1999) recommends subtitlers, when it comes to editing, to include a "reasonable percentage" of

the words spoken and to make sure that idea units appear as a "good percentage" of the spoken message. Using Chafe's criteria, the analysis presented in this article provides data to throw light on this issue with regard to respoken subtitles. Table 5 includes, apart from the already analysed information regarding speed, a percentage of the text reduction in the TT as compared to the ST (TxtRed), a percentage of the loss of information (Loss) in idea units in this editing process and a percentage of errors in the respoken subtitles (Errs):

Table 5. Text reduction and information loss in the programmes analysed

	Spt1	Spt2	Spt3	Spt4	Nws1	Nws2	Nws3	Int1	Int2	Wea1
Sp's	1	1	1	2	1	1	1	3	2	1
ST	124	147	176	182	161	178	198	211	245	232
TT	106	120	160	140	146	143	161	190	188	173
Diff.	- 18	-27	-16	- 42	-15	- 16	-37	-22	-57	-59
Txt Red	14.5%	18.4%	23%	9%	8.9%	9.3%	18.7%	10.4%	23.3%	25.3%
Loss	3.5%	6.6%	14.7%	11.5%	5%	12.5%	0%	7.7%	13.6%	10.7%
Errs	0%	2.5%	2.5%	1.4%	1.5%	2%	0%	0.5%	2.1%	1.7%

As can be seen in this table, with two exceptions, the percentage of information lost in the editing process is consistently lower than the percentage of text reduced. Whereas the average text reduction is 17%, the average loss of idea units is half this percentage: 8.5%. In other words, on half of the occasions on which the ST is reduced, no important information (or idea units) is lost. As a matter of fact, the figures show no correlation between the number of words omitted and the information loss, so much so that in Nws3, where the ST is substantially reduced (- 37 wpm), all idea units are maintained. On the one hand, respeakers seem to have successfully complied with the above-mentioned ITC guidelines, relaying a more than "reasonable percentage" of the words spoken (83%) and a better than "good percentage" (91.5%) of the spoken message with an impressively low error rate (1.4% on average). On the other hand, this illustrates the particular ability acquired by respeakers to identify and omit words without which the content of a script may still be conveyed. A qualitative analysis of these respoken subtitles shows that the main types of words omitted by respeakers are:

- Discourse markers: *so*, *well*, *I mean*, *you know*;
- Connectors: *and*, *but* and *though*. This means that respoken sentences are notably shorter than ST sentences, given that the absence of these conjunctions often entails the beginning of a new sentence.

- Intensifiers: *really, much more, well.*
- Repetitions and "unimportant" asides such as *you were saying* or *worth bearing in mind.*

Finally, a number of additions to the ST have also been identified. In all cases, these were contractions (*they'll, wasn't, it's*) that were expanded (*they will, was not, it is*), probably to ensure good recognition on the part of the software, which is less likely to produce an error with two words than with one.

6. Conclusions

As has been argued in this article, the widespread use of respeaking to produce live SDH makes it necessary to analyse this new type of subtitles and especially how they are received among deaf, hard-of-hearing and even hearing viewers. In this sense, the issue of speed is crucial. Far from being just a technical consideration, the speed of subtitles lies at the root of the old dichotomy between edited and verbatim subtitles, which is tinged with economic and ideological considerations. Fast, verbatim subtitles are supported by broadcasters, service providers (because they are cheaper) and deaf associations (because editing is regarded as censorship), whereas slower, edited subtitles are defended by academics and many viewers (because they can be read more easily). Some of the existing guidelines, such as those laid out by Ofcom in the UK, are based on research. Yet, paradoxically, the conclusions drawn do not necessarily match the findings of this research, Ofcom accepting a subtitling speed of up to 180wpm (15 cps) which most viewers seem to consider excessive. Most importantly, these guidelines do not make a provision for the new type of scrolling subtitles produced by respeaking in the UK. What are they like and how are they read by the viewers? This article has focused on the first part of this question, providing also hypotheses for a potential future analysis of the second part.

The analysis of ten programmes subtitled by respeaking and broadcast by the BBC between August and October 2008 has provided substantial data on respoken subtitles and on the issue of speed in general. First of all, as far as original televised speech rate is concerned, the results obtained here are in line with the research carried out to date. In sports, the programmes analysed range from 124wpm to 182wpm, with an average of 160wpm. News are spoken faster, between 161-198 wpm, with an average of 180wpm, and interviews/weather even faster, between 211wpm and 245wpm with an average of 230wpm. As for respeakers, their speed (i.e. that of their subtitles) ranges from 106 wpm to 190 wpm, which exceeds what was so far considered the fastest speech rate using this technique (174 wpm). In any case, what is particularly noticeable is that the respeaking rate depends invariably on the ST speech rate, respeakers usually lagging

20 wpm behind original speakers who speak at up to 180 wpm and 40 wpm behind speakers who speak faster. Interestingly, then, respeakers do not seem to be able to produce verbatim subtitles, even though this is what they are encouraged to do. Even when respeaking a sports programme delivered at a slower speech rate than respeakers can produce, they seem to lag 20 wpm behind. As argued in the present article, the reason for this may lie in the introduction of oral punctuation. Indeed, the average number of full stops and commas introduced is very similar to the number of words respeakers lag behind original speakers. In other words, respeakers do adapt to the ST speech rate and, especially in speeds up to 180wpm (sports and news), manage to utter the same amount of words per minute as the original –if we include full stops and commas in this count. This would be the reason why respoken subtitles seem to be invariably edited. In order to produce verbatim subtitles, respeakers would have to speak faster than their original speakers (uttering all the ST plus punctuation marks), which is probably against the grain in this shadowing-like type of translation.

The results obtained here raise another issue that merits a comment. To what extent, especially given what has been discussed in the literature, are respoken subtitles with a speed of up to 190wpm (16 cps) readable for deaf and hard-of-hearing viewers? Concurring with what is stated in the original ITC guidelines, Neves (2005) points out that subtitles shown at less than 180wpm could only be readable if they are displayed in blocks, in synchrony with the images and well segmented. As has been explained in this article, respoken subtitles may be faster than 180wpm, are displayed word for word, without synchrony and, in 71.8% of the cases, with poor segmentation. This does not detract, however, from the value of respoken subtitles nor from the truly admirable work carried out by the respeakers analysed here, who contribute to make a case for respeaking as the most appropriate method to provide live subtitles. In this sense, it should be noted that the error rate, often used to criticise this technique, is kept at an impressively low 1.4% for the average of the programmes analysed. Yet, there may still be room for improvement.

Out of the three features noted by the ITC guidelines and Neves, the scrolling display may be difficult to change for a block-by-block mode, given that it depends on the software used and, especially, because a display in blocks produces further delay. Therefore, the lack of synchrony of respoken subtitles with the images is also, at least for the time being, difficult to solve. At present, subtitling companies are forced to make a choice between using software that produces scrolling subtitles (more difficult to read) with 3-to-4-second delay or block subtitles (easier to read) with 4-to-6-second delay. A possible 'third way' would be to delay the broadcast of live events for some minutes, which could allow the display

of subtitles in blocks without delay and even edited to correct errors. The issues of competition among channels and even censorship that this may bring about could be solved if the decision to have or not have the signal delayed was taken at the viewers' end. Also subject to improvement is poor segmentation, which is not manageable by the respeaker but may be controlled by the software. It is perfectly possible, for example, to adapt the subtitling application used along with the speech-recognition software so that certain "practices" are avoided. Thus, the software may be set to prevent the division across two lines of particular elements such as names and surnames, articles and nouns, conjunctions such as *and/but* and the next word, etc. Likewise, whenever a full stop is followed by a single word at the end of a line, this word could be automatically sent to the beginning of the following line, thus avoiding an awkward line break and facilitating smooth reading on the part of the viewers.

Another potential modification may be the decrease in the speed of respoken subtitles, which would inevitably entail editing. This need not be seen as a problem. The data obtained in the present article suggests that this editing process, as performed by respeakers, loses a minimal amount of important information, given the respeakers' ability to edit words that do not contribute to the idea units conveyed in the original text (connectors, repetitions, asides, etc.). In this sense, it is worth noting that the common omission of conjunctions such as *and* and *but* point to a new syntax introduced by repoken subtitles, which seem to have shorter sentences than those used in "ordinary" subtitling. In any case, given that verbatim respeaking does not seem to be an option, at least for now, it would be advisable to limit respoken speed to 160 wpm (13 cps), which would entail editing an average of 20 wpm for news and sports and 40 wpm for interviews and weather, keeping 90% of the content. Judging by the hypothesis on the viewing patterns of scrolling subtitles advanced in this article (based on eye-tracking, with fixations and saccades), it would seem that this 10% of information lost at 160 wpm is likely to be much lower than the percentage of visual/verbal information that may be lost by viewers watching scrolling subtitles at 180wpm.

Yet, this is no more than a hypothesis. Our next step, having already cast some light on the nature and especially the speed of respoken subtitles, is to explore their reception. Do viewers comprehend them when they are displayed at speeds over 180wpm? Can viewers also see the images or are we turning viewers into mere readers of a particular type of news that, unlike newspapers, cannot be read at one's own pace? Although these questions remain open for the time being, they will surely find answers in the near future, as researchers and academics keep delving into this new area of respeaking-based subtitles.

7. Acknowledgements

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