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## **Less is More.**

# **Effects of the Amount of Information and Its Presentation in the Recall and Reception of Audio Described Characters\*\***

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### **Abstract**

Audio description is a discipline within Translation Studies aimed at making audio visual products and events accessible to blind and visually impaired audiences. Works of art, TV programs, films and stage arts are audio described in order to guarantee that anyone, regardless of his/her visual capacity, can enjoy them. In the case of films, it consists of a verbal description of visual details such as settings and characters (what they look like, what they do and how they do it) provided to the audience in those parts of the movie where no relevant sounds or dialogues are heard.

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\*\* This paper is part of a doctoral research framed within the PhD in Translation and Cross-Cultural Studies offered by the Department of Translation and Interpreting and East Asian Studies at Universitat Autònoma de Barcelona. It is also part of the project "Accesibilidad lingüística y sensorial", funded by the Spanish Ministerio de Economía y Competitividad (FFI2012-31024), and it is supported by Transmedia Catalonia research group (2014SGR27).

The nature of audio description, in which all the information is presented auditorily and at the fast pace usually imposed by films, might pose some challenges on users' memory. This paper is an attempt to explore this issue empirically by focusing on audio described characters. It presents a reception study designed to explore how the amount of information included in the audio description of characters and its presentation have an effect on users' recall. Results showed that limiting the information in the descriptions and dividing it into short units delivered at different stages of the AD favored users' memory.

**Keywords:** Audio description, accessibility, character, memory, reception study.

## **1. Introduction**

Audio description (AD) is aimed at making audiovisual entertainment accessible to the Blind and Visually Impaired (BVI). It involves conveying the relevant visual information into an auditory narration delivered to users in the silent parts of the audiovisual product. As it is often credited, it involves making the visual verbal [1]. On the other hand, AD potential users comprise a vastly heterogeneous group formed by congenitally blind individuals, people who were born sighted but became blind at different stages of their lives, and people with different degrees of low vision who perceive the images to some extent. Even though they might have different needs, the same AD has to work for all of them.

Its addressees and the inherent nature of AD, in which information can only be delivered in certain places and for a limited time, make for a precise selection of the visual details to be provided to receivers. What to describe and how to do it seem two of the hot topics for scholarly discussion. Literature in the field and most of the guidelines published in several countries state the idea that AD should include "relevant" or "essential" information [i.e. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], two terms as wide and as flexible as hard to embody. Concerning audio visual products, relevance is tightly related to perception and comprehension, that is, some details will be identified as relevant if they are perceived as necessary or, at least, important to comprehend the plot. However, the infinite uniqueness in the nature of the audio visual products makes it hard to provide a clear answer to the questions of what should be described and how.

Several approaches have been undertaken in the last years in attempts to shed some light on said issues. Linguistic and narrative aspects of the AD of films have been analyzed through descriptive, comparative and corpus studies [i.e. 5, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21], and empirical methodologies, including eye-tracker tests, have been used to analyze sighted spectators' perception and interpretation of films in the search for strategies that might help prioritize visual information in AD scripts [22, 23, 24, 25]. Some reception studies have also been undertaken, most of them aimed at finding out users' preferences concerning a variety of aspects [26, 27, 28, 29, 30]. Other reception studies have explored presence [31], users' emotions [32] and users' comprehension [33].

The present paper follows this path focusing on the specific case of audio described characters. Its contents are organized as follows: in the first section, an overview of how spectators and BVI audiences receive film characters will be exposed. Section 2 will focus on the role of memory in AD and section 3 will present an

empirical study aimed at exploring the effects that the amount of information included in their AD and its presentation have on the recall and reception of audio described characters.

## **2. The reception of film characters**

Research on film comprehension is not extensive and relies on prior studies exploring textual narrative comprehension. “Because both narrative texts and films are event-based, theories and findings derived from work on texts should generalize to film” [34, pp.383] and, by extension, also to the particular case of audio described movies.

It seems widely accepted that receivers (both readers and spectators) make sense of the narrative information they receive and they create situation models [35]. Those situation models are very close to what Johnson-Laird called mental models [36], that is, multimodal mental representations of the events taking place, which are updated as the plot unfolds [i.e. 37, 38, 39, 40, 41, 42].

In order to construct them, addressees frame the story within a specific spatial-temporal setting, which may vary throughout the story. Concurrently, they must identify and make sense of characters’ inner thoughts or, as film scholar Persson [43] calls them, mental states (their emotions, motivations, goals, hopes, beliefs, desires and feelings). In their search for narrative comprehension, receivers strive for coherence [44], and, hence, understanding the psychology of the characters becomes essential. It is their mental states which motivate characters’ actions and, with them, the development of the plot. In other words, characters’ mental dimension is of central importance to understand the cause-effect relations in written and filmic narratives.

Schneider [45] enunciated a theory of literary character reception that could also be applied to film and to AD. According to him, characters are a core part of the mental model and, as such, readers create and update specific models of them all throughout the narrative experience. Those mental representations of characters may contain visual and auditory information to recreate a somehow simplified version of the characters’ appearance, clothing, movements, voice, accent, and so on [46]. Schneider [45] takes his cue from Gerrig and Allbritton [47] and qualifies the process as dynamic, since the model is created and updated all throughout the narrative experience. Creating and updating the character model involves performing complex cognitive activities dependant on our working memory, which is considered to be a capacity-limited system [48, 49, 50]. In Schneider’s view, memory limitations are the reason why the model does not contain all the information about the character provided in the narrative. Instead, receivers create more basic representations which include the most relevant details. On the other hand and stating the obvious, movies do not usually portray a single character, but a constellation of them interacting with each other. Therefore, at least the mental models of those with more prominence in the plot should be outlined and related to each other in the receiver’s mind. Magliano, Taylor & Kim [51] showed that spectators actually monitor for certain mental states (specifically, goals) of several characters in the same filmic experience, being the most prominent characters those more closely observed. According to the authors, the fact that not all characters are monitored with the same intensity is also most likely due to working memory constraints.

Memory limitations should also be expected to have an effect in the reception of audio described movies in

general and in that of audio described characters in particular. The fact that all the information is delivered auditorily, at the usual fast pace of films and with little room for repetition, might pose specific memory challenges to users.

### **3. Memory and audio description**

Sighted spectators see and listen to movies, whereas BVI individuals mainly listen to them. All the visual elements important to the plot are conveyed verbally and provided to BVI audiences as a supplementary audio comment which, weaved through the dialogues and the sounds in the movie, creates the narrative of the filmic experience. Nevertheless, watching a film and listening to an audio described movie are two different experiences with different cognitive requirements.

Research within Perception and Memory studies seem to indicate the robustness of visual recall over verbal recall. Viewers are able to understand and identify the gist of complex visual scenes very rapidly [52, 53] and to recall them with certain detail, even after brief exposures to the original scenes [54, 55, 56]. Nevertheless, when similar tests are carried out using auditory materials, our performance is lower [57]. From a different perspective, research from Media Studies suggest that video information is processed with less effort than auditory information and that television scenes are recalled more effectively when they are video-based rather than when they are audio-based [58, 59]. Also, audio/video redundancy seems to have a positive effect on memory [60, 61]. Education Studies has also dealt with memory through the exploration of the cognitive resources needed in learning contexts. Research drawing on the Dual Coding Theory [62] suggests that students learn more effectively when provided with combinations of words and images, rather than with words alone [63, 64, 65, 66, 67].

It could perhaps be argued that AD addressees have better memory than sighted viewers for auditorily transmitted information due to the fact that they are more accustomed than their sighted counterparts, who tend to rely on their eyes to perceive the world around them [68]. However, experimental research comparing the verbal memory capacity of blind and sighted individuals has led to contradictory results [cf. 69, 70, 71]. Research using neuroimaging techniques seems to indicate an advantage of the congenitally blind over sighted viewers [72, 73] but this kind of research is still scarce and evidence indicating a better auditory verbal memory of the blind is still sporadic [74]. However, even if the congenitally blind possessed a better memory capacity, they constitute a statistically small fraction of the BVI. Therefore, their performance alone could not be considered representative for the whole group of potential AD users.

In light of the aforementioned research, it seems relevant to explore empirically how BVI audiences receive audio described films. Current practices do not take into account users' cognitive capacities and it is our suspicion that they might be the reason why certain addressees describe some pieces of AD as "tiring", "too extensive" or "too informative". This paper constitutes an attempt to assess the cognitive performance of the addressees through an empirical study.

#### **4. The current study**

Theoretical explanations of how spectators (re)create fiction characters in their minds and of the potential constraints that memory might pose to AD users have been discussed in previous sections. However, an empirical exploration of said issues is necessary in order to find out their real implications for the case of audio described characters.

Several AD guidelines offer recommendations on what should be described about characters. For instance, the Irish standards point out that, provided there is enough time, “dress, physical attributes, facial expressions, body language, ethnic background (if relevant to the storyline) and age should be audio described” [75, pp.1]. However, our hypothesis is that providing very detailed descriptions might not be the best strategy if we want users to remember them, as stated in the following hypotheses described next.

Hypothesis 1 (H1): Due to memory limitations, the more information included in the AD, the more difficult its recall.

In order to test H1, a specific research question was posed:

Research Question 1 (RQ1): Does the amount of information provided in the AD have an effect on its reception?

On the other hand, Lang’s work on memory for the media found evidence supporting the idea that information presentation has an effect on its processing and recall [76]. This view is shared within the Education field by scholars studying The Cognitive Load Theory [77, 78, 79], which divides the cognitive load in learning in intrinsic (that imposed by the difficulty of the task per se), germane (the resources needed to acquire and automate schemas), and extraneous (the cognitive load related to the way in which the information is presented). Cueing on said classification, intrinsic load in an audio described movie would be imposed by the complexity of the film itself and, hence, it would be independent from the AD. Germane load seems closely related to the addressee’s prior knowledge and, thus, also independent from the AD. However, extraneous load could be increased or reduced depending on the manner in which the AD is presented. The more difficult the AD is to understand, the more cognitive requirements will demand from the user. Our hypothesis, in line with these arguments, is that a proper presentation of the character information in the AD contributes to a more precise recall.

Hypothesis 2 (H2): Some strategies might help to reduce the extraneous cognitive load in the audio description of characters.

In their research of multimedia instructional designs, Wong et al. stated the following:

“One way in which the potential problems associated with transient information may be overcome is to present the potentially transient information in much shorter segments. A short segment of information should impose a reduced cognitive load compared with a longer segment.” [80, pp. 450].

Drawing on this argument, the following research question associated to H2 was posed:

Research Question 2 (RQ2): Are audio descriptions of characters better recalled when their description is segmented? By “segmented” we mean divided into short units of information which are delivered to the user at different stages of the clip.

#### **4.1 Methods**

The aforementioned hypotheses and research questions were explored by means of an experiment studying AD users' recall. In order to assess the amount of information recalled but also its accuracy, false recall (features wrongly ascribed to characters), was also controlled.

##### **4.1.1 Participants**

44 BVI participants took part in the experiment. The sample was formed by 21 male and 23 female aged 18 to 76 years ( $M=48.43$ ) ( $SD=13.72$ ). The age of the subjects was not restricted because we wanted the test to be as naturalistic as possible, with representative subjects of all ages. 40 of them were blind according to the World Health Organization standards (either they had an acuity minor to 0.05 or a visual camp minor to 10°) and 4 of them suffered from low vision (they had an acuity between to 0.3 and 0.05 or a visual camp minor to 10°).

Participants performed a digit span test in order to measure their short-term memory capacity. The mean score was 10.75 ( $SD=1.77$ ). The sample was then divided into two groups: those with a digit span score above the mean ( $n=22$ ;  $M=12.36$ ,  $SD=1.17$ ) and those below ( $n=22$ ;  $M=9.37$ ,  $SD=1.00$ ).

##### **4.1.2 Materials**

A self-contained excerpt (CAN) from the Spanish film *Caníbal* [81], a self-contained excerpt (PMS) from the Spanish-dubbed film *Pequeña Miss Sunshine* [82] and two self-contained excerpts (BB1 and BB2) from three chapters of the Spanish-dubbed version of the television series *Breaking Bad* [83, 84, 85] were chosen as the basis to create the corpus. All of them showed the same number of characters on screen and they were very similar in length, number of words in the dialogues and speed in the utterance in each of them. Table 2 shows these details.

Four AD scripts were then created for each clip (x 1+, x 2+, x 1- and x 2-), which differed only in the amount of information included in the characters' descriptions and in its presentation. The rest of the AD (that is, those parts in which the appearance of characters was not described) remained the same. From the four scripts created for each clip, two (x 1+ and x 2+) included long character AD mentioning 8 physical traits of each character. However, those traits were presented as a single block of information in one of the scripts (x 1+), whereas in the other one (x 2+) the description was split into two blocks of 4 traits that were presented separated from each other.

Table 2. Number of characters, length, number of words in the dialogues, and speed of utterance in the clips selected to create the corpus.

<b>Audio clip</b>	<b>Characters</b>	<b>Length</b>	<b>Number of words in dialogues</b>	<b>Speed in utterance (words per second)</b>
CAN	3 male and 2 female	8:47	521	3
PMS	3 male and 2 female	8:12	535	3
BB1	3 male and 2 female	8:17	525	3
BB2	3 male and 2 female	8:42	552	3

Table 3. Number of traits and blocks of information in each clip of the corpus.

<b>Audio clip</b>	<b>Number of traits per character</b>	<b>Blocks of info</b>
CAN 1+	8	1 block of 8 traits
CAN 2+	8	2 blocks of 4 traits
CAN 1-	4	1 block of 4 traits
CAN 2-	4	2 blocks of 2 traits
BB1 1+	8	1 block of 8 traits
BB1 2+	8	2 blocks of 4 traits
BB1 1-	4	1 block of 4 traits
BB1 2-	4	2 blocks of 2 traits
BB2 1+	8	1 block of 8 traits
BB2 2+	8	2 blocks of 4 traits
BB2 1-	4	1 block of 4 traits
BB2 2-	4	2 blocks of 2 traits
PMS 1+	8	1 block of 8 traits
PMS 2+	8	2 blocks of 4 traits
PMS 1-	4	1 block of 4 traits
PMS 2-	4	2 blocks of 2 traits

The remaining two scripts (x 1- and x 2-) showed short characters AD, mentioning 4 physical traits of each character. Again, in one of them (x 1-) all the traits formed a single block of information, whereas in the other (x 2-) the description was divided into two blocks of two traits allocated with a certain distance between each other in the script. The physical traits to be included in the long and short AD of each character were decided by a group of ten volunteers aged from 25 to 34 years old who formed a focus group. They watched the four clips (with image) and agreed on the 8 most relevant traits for each character. Those were included in the long AD. From those, they voted for the 4 features that seemed more important to them. The 4 traits of each character that received the most votes were included in the short scripts.

Once the scripts were ready, the four AD of each clip were recorded by a voice talent and mixed in a professional studio to obtain the sixteen final audio clips (.wav) that formed our corpus. Table 3 shows the number of traits and information blocks of each audio clip in the corpus. During the recording, the speed in the delivery of all the AD was controlled. Cabeza-Cáceres [33] found that when AD is delivered at a speed of 14 characters per second, users' comprehension is comparable to that of sighted viewers. However, when AD is faster, comprehension rates decrease. Therefore, we limited the speed in delivery of our AD to 14 characters per second (around 3 words per second).

Two instruments were used in this experiment: a questionnaire designed by our team to measure users' recall of the AD and the WAIS-III Digit Span Forward and Backward tests [86].

#### **a). Recall questionnaire**

The recall questionnaire included two parts: in the first one, free recall of characters was assessed, and in the second part, recognition of the physical traits of characters was measured.

##### **Free recall**

The free recall part included the three questions below:

1. Do you think that you have understood the clip?

This question was included in the questionnaire to assess participants' perception of their own comprehension. Due to the tight relationship between memory and comprehension, we expected the recall of those subjects who reported bad comprehension of the audio clips to be poor.

2. What is (character name) like? State all the details that you remember about him/her. Please refer to his/her physical description and to his/her personality.

The aim of this question was to explore how many physical traits the participants remembered spontaneously from two of the five characters described in each clip (characters A and B).



3. Could you imagine character A/B with the information you have received?

Through this question we wished to find out if the information provided in the AD, together with the dialogues and the sounds in the film, was sufficient to imagine the characters. If so, that would indicate the creation of some sort of mental representation, even if a very basic one.

### Recognition

Participants had to answer yes or no questions about characters A and B. In case they did not know, they could answer “I don’t remember”, but they were instructed to avoid this option if possible. Half of the questions in the recognition task presented the real physical traits explicitly mentioned in the AD of A and B. Therefore, the correct answer to those questions was “yes”. In the other half of the questions, invented traits and traits mentioned in the AD of other characters were ascribed to A and B. The correct answer to those questions was “no”. It should be noted here that the other characters mentioned above had the same sex as A and B in order to maintain coherence (it would not make sense to ask if a woman had a beard), and they could appear in any of the clips. From all the potential options available, the selection of the false traits included in the questionnaire was performed randomly.

The recognition part also included some more questions about other issues unrelated to characters, which sought to distract participants’ attention from the real aim of the study. All the questions in this part of the questionnaire were randomly distributed. Table 4 shows the amount of questions of each type included in the questionnaires designed for the long and short versions of each clip.

Table 4. Amount and type of questions included in the long and short questionnaires.

	Long AD (x +)	Short AD (x -)
Number of questions which presented real traits of characters A and B	8	4
Number of questions which ascribed traits from other characters in any clip to characters A and B	4	2
Number of questions which ascribed invented traits to characters A and B	4	2
Number of distracting questions about other topics	16	8

A sample of the recall questionnaires for the long and short AD of one of the characters in our corpus is shown in Annex I.

## **b). WAIS-III**

The WAIS-III Digit Span Forward and Backward tests [86] were also administered to measure participants' memory span and classify them into two groups: subjects with high and low span.

### **4.1.3 Design and Procedure**

Three people (two totally blind and one with severe low vision) participated in a pre-test, which indicated the need to clarify one of the questions in the free recall part of the questionnaire (see the final questionnaire in Annex 1). After the proper corrections had been made and the actual test was approved by the Ethics Commission at Universitat Autònoma de Barcelona, it was carried out.

Participants were tested one at a time. Firstly, they completed the WAIS-III Digit Span Forward and Backward tests. Then, they listened to four audio clips from the corpus, one of each condition (w 1+, x 2+, y 1- and z 2-). They were instructed to listen to them as if being in the cinema or at home, and they were just told that after each clip they would have to answer several questions. Before each clip, a summary of the prior events in the story was read to participants in order to avoid comprehension gaps. The name of each character and an indication of their role in the clip (e.g. "Richard, the father" or "Carlos, the tailor") were also mentioned for the same reason. After each audio clip, the researcher read the questions in the questionnaire and wrote down the participants' answers. The audio clips to be listened by each participant, the order of those and the two characters per clip about whom they would be asked were counterbalanced. It was a 2x2 (number of blocks and amount of information) within-subjects design

## **4.2 Results**

RQ1 and RQ2 were aimed at exploring if the amount of information included in the characters' AD and the manner in which it was presented affected users' reception. In order to assess the results, the participants' answers in the two parts of the questionnaires (free recall and recognition) were treated separately.

Firstly, data obtained from the free recall questions was analyzed. As an answer to the question assessing participants' perception of their own comprehension with the information received, all participants reported good understanding of every clip and bad recall was not attributed to comprehension problems in any case. As per their capacity to imagine characters, all participants reported being able to imagine to some extent the characters they were asked about.

To analyze the proportion of correctly freely recalled physical traits, a repeated measures ANOVA 2x2 (number of blocks and amount of information) was conducted. Results showed a significant main effect of number of blocks,  $F(1,43)=8.641$ ,  $p=.005$ ; suggesting that more traits were correctly recalled when information was presented in two blocks ( $M=.50$ ) compared to one block ( $M=.43$ ). There was also a significant main effect of amount of information  $F(1,43)=18.992$ ,  $p<.000$ , showing that when less information was presented ( $M=.52$ ) participants recalled more features correctly than when more information was presented ( $M=.41$ ). The interaction between the two factors was non-significant, but the mean proportion of correct recall as a function

of block and amount of information can be seen in Figure 1.

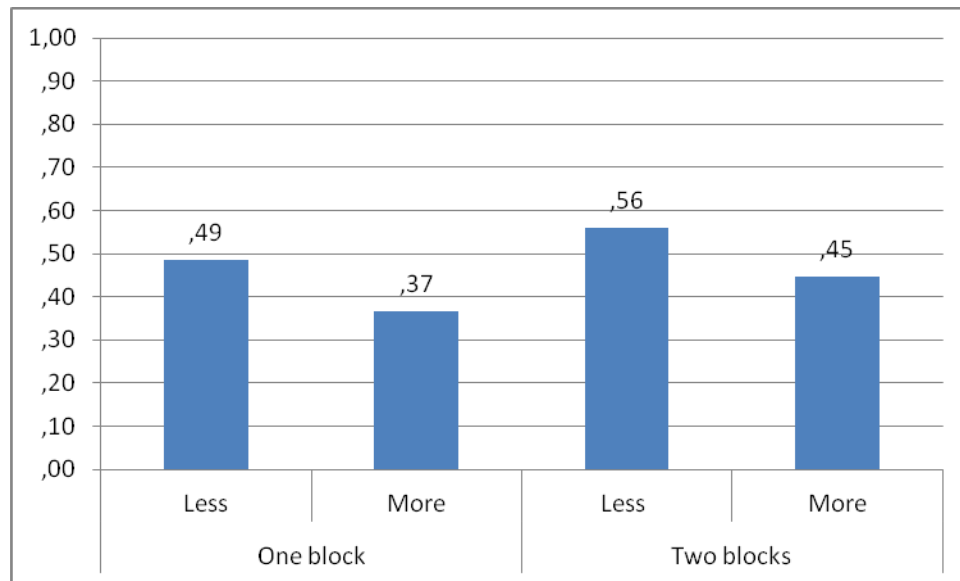


Figure 1. Mean proportion of correct recall as a function of block and amount of information in the free recall task.

Further ANOVA tests were conducted on the proportion of correctly recalled features for each group. For the group with lower short-term memory span, the two factors were significant in the same line as the whole sample (block:  $F(1,21)=6.747$ ,  $p=.017$ ; amount of information:  $F(1,21)=12.491$ ,  $p=.002$ ) so there was a better recall when the information was presented in two blocks ( $M=.50$ ) and less information was shown ( $M=.52$ ) compared to one block ( $M=.40$ ) and more information ( $M=.38$ ). However, for the higher short-term memory span group, only the amount of information was significant,  $F(1,21)=6.653$ ,  $p=.017$ , again showing better recall when less information was presented ( $M=.53$ ) compared to more ( $M=.44$ ). This group was not affected by presenting the information in one or two blocks ( $M=.46$  and  $M=.51$  respectively).

Regarding false recall (number of features recalled but not present in the clips), no significant differences were found as a function of block (one block:  $M=1.25$ , two blocks:  $M=1.17$ ) nor amount of information (less:  $M=1.10$ , more:  $M=1.32$ ) in the whole sample. Separate analyses for each group of high and low short-term memory span revealed no differences in this measure.

Then, data obtained from the recognition questions was analyzed. A repeated measures ANOVA 2x2 (number of blocks and amount of information) was conducted on the proportion of correctly recognized features (hits). Results showed a significant main effect only of number of blocks,  $F(1,43)=4.509$ ,  $p=.040$ ; suggesting that more features were recognized when information was presented in two blocks ( $M=.70$ ) compared to one block ( $M=.62$ ). Amount of information was not significant,  $F(1,43)=2.794$ ,  $p=.102$  showing equivalent recognition when less information ( $M=.70$ ) or more information was presented ( $M=.66$ ). The interaction between the two factors was also non-significant, but the mean proportion recognition as a function of block and amount of information can be seen in Figure 2.

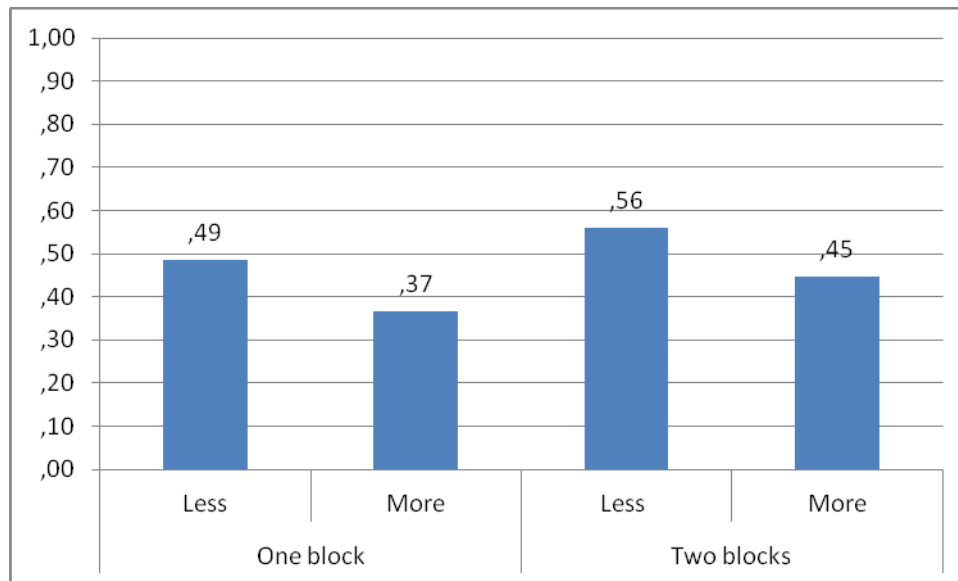


Figure 2. Mean proportion recognition as a function of block and amount of information in the recognition task.

Again, further ANOVA tests were conducted on the proportion of correctly recognized features for each group, but no significant differences were found as a function of short-term memory span. However, there was a significant effect in the errors as a function of amount of information in the low short-term memory span group  $F(1,21) = p=.034$ , showing more errors when more information was presented ( $M=.17$ ) compared to less information ( $M=.13$ ).

In the whole sample, results showed no differences in errors as a function of number of blocks (one block:  $M=.15$ , two blocks:  $M=.14$ ) and amount of information (less:  $M=.13$ , more:  $M=.16$ ). The same non-significant pattern was found for no recall scores (one block:  $M=.19$ , two blocks:  $M=.16$ , less:  $M=.17$ , more:  $M=.18$ ).

### Qualitative analysis

The data obtained in the experiment could also be analyzed from a different perspective. Regarding the average free recall rates, performance ranged from 37% in the worst condition (1+) to a maximum of 56% in the best condition (2-). When focusing on the recognition questions, better performance was found, which ranged from 63% in the worst condition (1+) to 70% in the best (2-). These figures showed the average recall for all the characters in the clips. However, if the data is analyzed in relation to the prominence of the characters in each video, the free recall of main characters ranged from 41% (1+) to 56% (2-), whereas that for the secondary characters went from 31% (1+) to 56% (2-). In the recognition questions, less differences in hit rates for main and secondary characters were found: from 65% (1+) to 73% (1-) for the former and from 60% (1+) to 72% (2-) for the latter. Finally, if false recall is considered within the free recall context, more traits were mistakenly ascribed in every condition to main characters (129) than to secondary characters (84). In the recognition task, the rates of errors were the same for main and secondary characters (12% in the best condition to 17% in the worst).

## **5. Discussion**

The present experiment has explored empirically the recall of audio described characters by the participants in the test. We addressed two research questions: if the amount of information included in the AD had an effect on its reception (RQ1) and if segmented descriptions of characters led to a better recall of their traits (RQ2). We will start by discussing the results obtained in the free recall and in the recognition tasks in relation to RQ1 and we will then do the same with RQ2. Finally, some general remarks will be discussed.

In order to find an answer to RQ1, statistical analysis was carried out on the results obtained in the free recall questions, which showed that the amount of information included in the AD had an effect on users' memory. When less information was mentioned in the characters' descriptions, more of their traits were correctly recalled. This tendency was observed for participants with both low and high memory span, which suggests that even subjects with "good memory" may have found it hard to remember many traits of audio described characters. False recall was not affected by the amount of information provided in the AD and, in the recognition task, the amount of information did not show any effect on the number of traits correctly recognized. The only significant difference was found in the number of errors made by subjects with low memory span, which increased when they listened to a long AD of characters. These findings are consistent with H1 since they indicate that the longer the AD, the more traits are likely to be forgotten. However, since neither false recall nor the number of errors in the recognition task increased when long AD were presented, including more information in the AD did not seem to lead to a more distorted recall (except for participants with a low memory span). Therefore, it could be argued that the amount of information included in the AD had an effect on the comprehensiveness of the recall (that is, in the amount of traits correctly remembered), but it only affected its accuracy (the number of traits mistakenly ascribed to the characters) in the case of users with a low memory span.

As per RQ2, results obtained in the free recall questions showed better general memory performance when the AD of characters were segmented in two blocks. This presentation of the information benefited participants with low memory span but not those with high memory span, whose performance was not improved when information was segmented. This might be due to the fact that subjects with high memory span were able to manage larger units of information than their counterparts at the same cognitive cost. Whereas false recall was not affected by AD segmentation, this strategy showed a positive effect in the recognition task. These findings are in line with H2 since they indicate that more traits of characters were recalled when the information in their description is segmented. Nevertheless, the number of false recall and of errors in the recognition task did not decrease when two-block AD were presented, which suggests that segmentation affected the comprehensiveness of the recall, but not its accuracy. When taken together, these findings could be interpreted as an indication that correctly recalling more traits might lead to more comprehensive mental models of audio described characters.

Focusing on our qualitative analysis, it showed that, even in the best condition, only a little more than half of the information provided was freely recalled as an average. When analyzing the recognition questions, better performance was found, but it remained below 70%, even when short and segmented AD were provided. If this data is analyzed in relation to the prominence of the characters in each video, it is interesting to note that the

recall of the protagonists was better than that of the secondary characters. This is in line with Schneider's idea that addressees put more effort in outlining the models of the main characters in written narrative contexts [45], and supports the extension of this argument to the field of AD. Furthermore, this finding is coherent with [51], who stated that main characters' mental states were observed more closely than those of the rest of the characters. Perhaps, spectators do not only monitor intensely their mental states, but any information about primary characters that helps them update their model. In any case, almost half of the information provided about the main characters was forgotten by the participants in free recall questions. Better performance was found in the recognition task even though, again, a number of traits were not mentioned in the recall.

This might be due to the fact that the AD mentioned physical traits of characters, the majority of which were unessential to comprehend the story plot. Due to memory limitations, AD users might sacrifice part of those details to allocate more relevant information, such as the characters' mental states. These were indeed mentioned in almost all the questionnaires completed by our participants, which could be a clue to the essential role that character psychology plays in narrative film comprehension. Finally, if false recall is considered, more traits were mistakenly ascribed in every condition to main characters than to secondary characters. This is also consistent with our previous argument, since it could be interpreted as the struggle of BVI audiences' to create more comprehensive models of the most prominent characters. Since they are perceived as more important for the story, AD users might feel like they need more detailed representations of them and, thus, they may try to fill in the blanks by ascribing more traits to their models.

## **6. Conclusions**

These results shed some light on the issue of how to audio describe. The amount of information included in the AD and its presentation proved to have an effect on the reception of our corpus. Limiting the information to be provided in the descriptions and dividing it into shorter units delivered at different stages of the AD favored users' recall and, possibly, also the integration of more information into the mental model. However, our study had some limitations. To start with, we tested the reception of brief audio clips, the reception of which might differ from that of complete movies. In addition, the four stories selected were very similar in terms of genre. Finally, finding BVI AD users willing to take part in our research experiment was not easy. Therefore, we worked with a limited number of participants.

Despite the aforementioned limitations, some implications might be drawn from these findings concerning the creation of professional scripts. To start with, AD must be located in those parts of the film where no dialogue or relevant sound is heard and this, inevitably, conditions the audio describer's selection and presentation of the AD contents. However, if space constrictions allow, several recommendations could be provided in order to facilitate users' recall of the script. In those cases in which certain traits of a particular character have a strong narrative relevance in the plot, audio describers might want to create shorter AD so that the audience is more likely to remember them. However, when many details need to be included in the AD, segmentation might be a good choice. It is a common practice to provide the whole description of characters the first time they appear on screen so that the audience can have every visual detail right from the beginning. Nevertheless, logic as this might be, drawing on our results it would seem more convenient to create short "bites of AD" and deliver them

at different stages of the characters' appearances. With such a strategy, information sequencing would be sacrificed for the benefit of memory: users would receive the same information (even though some of it would come later) but they would be more likely to remember it. Furthermore, when dealing with characters whose physical traits are not that important, audio describers might want to avoid very detailed descriptions and use more generic ways to refer to them. For instance, it might suffice to mention that the character is wearing "casual clothes", "sport attire" or simply "jeans" in order to transmit the style of his/her clothing. With such descriptions, specific unimportant details will be lost but shorter descriptions, again easier to recall, will be delivered.

Some implications of our reception study have been briefly discussed in relation to the AD of characters. However, the methodology exposed in this paper could also be useful to explore the reception of other audio described elements. For instance, similar studies could be applied to investigate the recall of settings in order to find out if users need comprehensive descriptions of locations. Also, short audio clips were used as a corpus in our experiment, but it would be convenient to analyze users' reception of characters after listening to complete audio described films. Different genres could also be tested to explore if similar results are found. Methodologies analyzing users' recall could also be undertaken to investigate further strategies that might help to reduce extraneous cognitive load in AD. "Anchoring" [24], selective repetition and vivid presentation of the relevant information seem appropriate candidates. It would also be interesting to investigate how the amount of verbal information provided in a film by means of the dialogues and the AD affects its reception. If memory capacity is limited, movies with much and dense dialogue might pose a greater challenge on spectators than "lighter" films. Therefore, strategies that reduce users' cognitive load in AD would benefit especially the former.

All in all, our experiment is another example of how Translation Studies can benefit from research methods used in Psychology. It is our hope that this interdisciplinary approach will continue since more empirical research is needed in our field.

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## Annex I

Sample of the long and short questionnaires administered to the participants in the test.

### Recall questionnaire - BB1+

#### 1. Do you think you have understood the clip?

Yes

☐

No

☐

2. HANK is the first character appearing in the clip (the man who helps Walter move to his new apartment). What is he like? State all the details that you remember about him. Please refer to his physical description and to his personality.

#### 3. Could you imagine HANK with the information you have received?

Yes

☐

No

☐

4. Please answer “yes” or “no” to the following questions. In case you do not know, please answer “I don’t remember”.

-> Hank wears a checked shirt

Yes

☐

No

☐

I don’t remember

☐

-> Hank is short

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Skyler drives a black 4x4

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank wears a brown shirt

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank wears a stripped shirt

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank wears blue jeans

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter's apartment is small

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank drives a brown car

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Skyler and Flynn live in a detached house

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter moves to a modest apartment

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank has a goatee

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> The furniture in Walter's apartment is old

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter drives a blue Beetle

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank's hair is black

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Very little light gets into Walter's apartment

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank is around fifty years-old

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> There is a picture of Skyler and Flynn in Walter's apartment

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank has a beard

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank is thin

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> There are a few pieces of furniture in Walter's apartment

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter drives a brown car

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> The table in Walter's apartment is messy with papers

_____	_____	_____
-------	-------	-------



Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank is bald

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank is robust

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> There are pictures of Walter and Flynn in Skyler's house

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank wears black trousers

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter finds a plastic eye while cleaning the pool

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> The furniture in Walter's apartment is white

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank uses crutches

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> The coach in Walter's apartment is small

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank wears sunglasses

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank wears trekking shoes

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

**Recall questionnaire - BB1-**

**1. Do you think you have understood the clip?**

Yes ☐ No ☐

**2. HANK is the first character appearing in the clip (the man who helps Walter move to his new apartment). What is he like? State all the details that you remember about him. Please refer to his physical description and to his personality.**

**3. Could you imagine HANK with the information you have received?**

Yes ☐ No ☐

**4. Please answer “yes” or “no” to the following questions. In case you do not know, please answer “I don’t remember”.**

-> Hank wears a checked shirt

Yes ☐ No ☐ I don’t remember ☐

-> Hank has a goatee

Yes ☐ No ☐ I don’t remember ☐

-> Skyler drives a black 4x4

Yes ☐ No ☐ I don’t remember ☐

-> Hank wears sunglasses

Yes ☐ No ☐ I don’t remember ☐

-> Hank is bald

\_\_\_\_\_

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank is robust

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter's apartment is small

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank drives a brown car

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Skyler and Flynn live in a detached house

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> The furniture in Walter's apartment is old

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Walter drives a blue Beetle

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank's hair is black

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank is around fifty years-old

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> The furniture in Walter's apartment is white

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	I don't remember	<input type="checkbox"/>
-----	--------------------------	----	--------------------------	------------------	--------------------------

-> Hank has a beard

Yes

☐

No

☐

I don't remember

☐

-> The couch in Walter's apartment is small

Yes

☐

No

☐

I don't remember

☐