AUDIBLE BREATH INTAKES IN MONOLOGUES

METTOUCHI, Amina[1]*

[1]EPHE, PSL & CNRS, LLACAN

Abstract: *Although they have long been used in the transcription of spoken interactions, audible breath intakes have seldom been studied in their own right. This paper is a first step towards the analysis of their role and functions in a lesser-described language, Kabyle (Berber), in which oral storytelling is part of the traditional skills of older female speakers. Based on forty minutes (408 audible breath intakes) of monologue (two folktales and a personal recount), told by the same speaker, this perception- and acoustic-based study tests some hypotheses proposed in the literature concerning the correlation of breath intakes with disfluencies or sociolinguistic factors. It provides evidence for correlations between genre and audible breath intakes: while standalone audible breath intakes preceded by non-terminal boundary tones characterize the recount, the folktales are marked by a high number of complex pauses, preceded by terminal boundary tones, involving a silent pause preceding an audible breath intake. This qualitative study underlines the importance of segmenting various pause types, and annotating them.*

Keywords: *pause; breathing; inbreathe; genre; monologue; Kabyle; Berber.*

1. Introduction

Breathing is a vital physiological need, but physiology is not enough to explain the patterns of occurrence of respiration in speech. Comparison between vital breathing and speech breathing shows that vital breathing cycles are more symmetrical (featuring more equal inhalation and exhalations) than speech breathing cycles (Mc Farland, 2001). This implies that breath intakes in speech are not totally governed by the need to regularly oxygenate the brain and body. They occur at specific moments in speech, and therefore depend to a certain extent on the way speakers plan and monitor their discourse, and their interaction (Schegloff, 2006; Kendrick and Torreira, 2015; Torreira, Bögels and Levinson, 2015; Fuchs, Petrone, Krivokapic and Hoole, 2013).

Among the studies devoted to speech breathing, 'breath intake' does not always refer to the same phenomenon: in some publications the perspective is physiological (lung activity measured by an inductive plethysmography system) (Torreira, Bögels and Levinson, 2015; Barbosa and Madureira, 2018), in others it is acoustic and articulatory (Scobbie, Schaeffler and Mennen, 2011), in others still, it is perceptual (Winter and Grawunder, 2012; O'Connell and Kowal, 1994; Yuan and Li, 2007), with acoustic correlates. Most studies are concerned with either elicitation of words or sentences (Scobbie, Schaeffler and Mennen, 2011) or speech in interaction, in semi-directed tasks (Torreira, Bögels and Levinson, 2015; Winter and Grawunder, 2012; Barbosa and Madureira, 2018). Among the studies based on natural speech, the perspective has been mostly interactional or sociolinguistic (Torreira, Bögels and Levinson, 2015; Winter and Grawunder, 2012; Yuan and Li, 2007). The languages investigated are major languages (English, German, Dutch, Korean, Japanese, Brazilian Portuguese).

The present paper, which is a perception- and acoustic-based qualitative study, sheds a different light on the question of speech breathing by focussing on breath intakes in spontaneous monologues, in a lesser-described language.

Linguistically speaking, breath intakes belong to the category of pauses. From the point of view of perception, pauses in speech are of various types. Some of them are 'filled' (with vocalizations or fillers such as *mmh*, *ehm*, *ə:::,* etc.), and some of them are silent or almost so. Among the latter, some correspond to exhalations and some to inhalations. The latter comprise

*Corresponding author: aminamettouchi@me.com

fully silent pauses, where breathing is inexistent or inaudible to the interlocutor, and more or less audible breath intakes.

The question triggered by the existence of such pauses is: what is the purpose of those audible inhalations, when it is also perfectly possible to breathe (almost) silently? The perspective adopted here is that those audible inhalations contribute to signaling something to the listener.

This is certainly the rationale behind transcription systems (Jefferson, 1984), especially in conversation analysis, where audible inhalations and exhalations symbols, such as hhh, or .hhh, have been regularly included. However, despite extensive use of those symbols in transcripts, studies of the pragmatic function of audible breath intakes are rare: "throughout the actual empirical research literature on spoken discourse, we have not been able to find any mention of audible breathing." (O'Connell and Kowal, 1994: 101). The situation has not changed in recent years, including in more phonetically-oriented research "Noises made before the acoustic onset of speech are typically ignored" (Scobbie, Schaeffler and Mennen, 2011: 1782).

The purpose of the following exploratory analysis of audible breath intakes in spontaneous Kabyle (Berber) monologues is to contribute to the study of speech breathing, by uncovering a few meaningful tendencies, and correlations between audible breath intakes and variation in discourse type and genre - with individual variation controlled by the fact that the recordings are all by the same monolingual woman.

2 Language, data and method

2.1 Kabyle (Berber)

Berber languages are spoken in northern Africa, in a zone delimited by the Atlantic Ocean to the West, the Mediterranean to the North, the Nile to the East, and the Sahel region to the South. Those languages constitute a family within the Afro-asiatic phylum. Kabyle is a Northern Berber language spoken in Algeria by about four million people. Women born before the 1970s and living in rural areas are mostly non-literate monolinguals, some of them highly skilled in oral tradition: they compose poetry, sing traditional songs, perform storytelling within the family circle.

There is no complete and precise study of Kabyle prosody. Chaker (1995a, 1995b) provide rules of accentuation distinguishing verb phrases from noun phrases in isolation, but those rules are overridden in connected speech, where accentuation is on the final syllable of the unit, with local prominences linked to information structure constraints interacting with syntax. Words are typically composed of three or four morphemes (stem, affixes, clitics).

2.2 Data

The data consist of two folktales and a personal recount, for a total duration of 41 minutes, all told by the same speaker, a monolingual Kabyle woman, Mrs. Tounsia Rabia, born in 1962, and used to storytelling. She was aged about 45 at the time of the recordings. She learnt her folktales from her grandmother, with whom she used to spend a lot of time as a child. A detailed summary of the contents of the two folktales and the recount can be found in Mettouchi (2015).

A conversation involving Mrs. Rabia and two other speakers was used for control on the role of discourse type (monologue vs dialogue).

Table 1 Size of the corpus

	DURATION (mn)	MORPHEMES	WORDS	INTONATION UNITS + PAUSAL UNITS	PAUSAL UNITS
FOLKTALE 01	13:29	6639	1803	1006	392
FOLKTALE 02	12:16	6044	1748	918	372
RECOUNT 03	15:20	7302	2502	1159	365
Total Monologues	41:05	19 985	6053	3083	1129
CONVERSATION	8:06	3351	1384	680	-

The corpus was recorded in the village of Ait Ikhlef (At Idjer tribe, Kabylie, Algeria) with an Edirol R-09, in .wav format, and with a Sennheiser lapel microphone. The transcripts were segmented into intonation units on the basis of native speaker perception, and acoustic control with Praat[1]. Praat control showed that the cues taken into account by the native speakers who segmented the data are the ones usually mentioned in the literature: final lengthening; initial rush; pitch reset; pause; creaky voice; declination; isotonia; coherent F0 contour.

Then, monitoring the transcript in Praat with visible spectrogram, the annotator manually added units for silent pauses over 200ms (this threshold allows exclusion of occlusion intervals in consonants), and for audible inspirations.

Length of silent pauses and audible breath intakes was indicated in the transcript. The Praat Textgrid was then imported into Elan-CorpA[2] for morphosyntactic annotation.

Figure A: Annotated corpus in Elan-CorpA

For the present study, the original Elan-CorpA files were reexported into Praat and rechecked for pause type and duration: from an original annotation into two types of pauses (silent and with an audible breath intake) a finer-grained annotation was produced, distinguishing between silent pauses/inaudible inbreaths (abbreviated as SP in this study), reflex/relaxed slightly audible inbreaths (INSP), and clearly audible controlled/voluntary inbreaths (ABI).

It is not so simple to define degrees in the audibility and quality of breath intakes, but both perception and analysis with Praat allow to distinguish two types, that are characterized by, on the one hand, sustained constriction of the vocal tract during inspiration (manifested as extended frication), and, on the other hand, more reflex inbreathing, realized with a more relaxed vocal tract. The latter can be slightly audible, but is distinguishable from the former by its less marked frication, recognizable on the spectrogram by its less pronounced formants (b), as opposed to controlled/voluntary audible breath intakes (c).

---

[1] http://www.praat.org

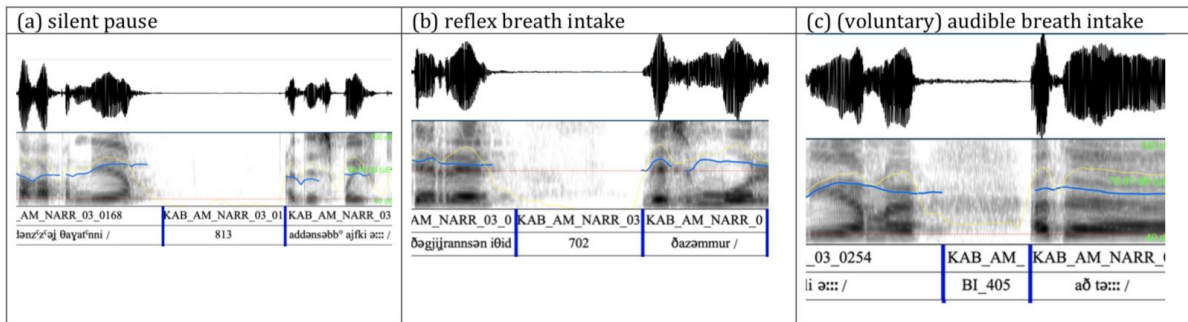[2] See (Chanard, 2015), http://llacan.vjf.cnrs.fr/res_ELAN-CorpA.php

Figure B: Silent pause (a), reflex breath intake (b), voluntary/controlled audible breath intake (c) (range 0 to 55 dB), for the same speaker, in the same recording

The three types are distinguished on the basis of perception and acoustic control, which means that breathing can occur in silent pauses as well. The present study is not concerned with breathing as such, but with its audibility.

In the rest of the paper, silent/inaudible pauses will be abbreviated as SP, reflex/relaxed audible inspirations as INSP, and controlled/voluntary breath intakes as ABI. Silent pauses and audible breath intakes' duration correspond to the total length of the pause, but, for reflex/relaxed inbreaths, durations correspond to the whole length of the pausal unit in which such inspirations occur, they may therefore contain a silent part. This is due to the less clearly perceived (and acoustically visible in Praat) distinction between silence and inbreath, which does not allow precise positioning of boundaries between the fully silent part and the slightly audible one.

3 Results

The total number of units, non-pausal and pausal, is 3083 for the three monologues (cf. Table 1). With audible breath intakes, audible inspirations, and silent pauses amounting to 1129, the ratio is one pausal unit for two intonation units, on average.

3.1 Types of pauses

Silent pauses (SP), audible inspirations (INSP) and audible breath intakes (ABI) are distributed as shown in Table 3 below. As far as duration is concerned, the mean and median length of silent pauses and audible breath intakes given in Table 2 show that silent pauses are slightly longer, but that duration does not specifically characterize one or the other type. In particular, the convergence between mean and median values of ABI observed for NARR01 is not so striking in NARR02 or NARR03.

Table 2: Average length of audible breath intakes and silent pauses (in milliseconds)

Pause Type	NARR01		NARR02		NARR03	
	ABI	SP	ABI	SP	ABI	SP
Mean	404,4	460,8	406	498,6	368,7	503,2
Median	401,5	413	358	460,8	345,5	432,5

Physiological inbreath has been proved to last over 800ms on average (Torreira, Bögels and Levinson, 2015). Audible breath intakes in our data are in general half that long (more than 80% of ABI last less than 500ms).

Table 3: Distribution of types of pauses (in number of pauses)

GENRE	SP	INSP	ABI	ABI alone	SP alone	SP before ABI	ABI before SP
FOLKTALE 01	206	42	144	57	119	87	0
FOLKTALE 02	212	20	140	36	108	104	0
RECOUNT 03	144	97	124	114	134	10	0
CONVERSATION	-	-	18	-	-	-	-

The first striking difference is linked to discourse type. The conversation, which is about half the length of each of the monologues, is a discussion among three women friends (the main speaker is the second speaker's sister in law), about the genealogy of the family. In that conversation, there are only 18 audible breath intakes over a total of 680 units (12 ABI for the main speaker, 6 for the second speaker, and none for the third speaker, who is the teller of the three monologues - silent pauses were not analyzed because of methodological issues (speaker attribution and length)). More conversational data are needed though, to see whether this profile is linked to more specific factors (friendly vs formal, familiar vs unfamiliar topics, etc.).

Now among the monologues, while in the two folktales more than half of the pauses are silent, and there are comparatively few relaxed inspirations compared to audible breath intakes, the recount is characterized by a more balanced repartition between the three types of pauses (Figure C).
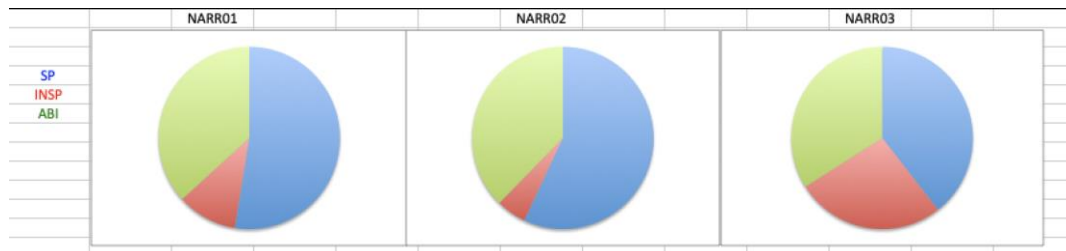

Figure C: Ratio of ABI to INSP to SP (out of all pauses) in the two folktales and the recount

This tends to distinguish, within the monologues, the folktales (NARR01 and NARR02) from the recount (NARR03).

Another finding based on the data in Table 3 is the presence, beside the three types of pauses annotated in the transcripts, of another kind of unit: complex pauses composed of a silent pause followed by an audible breath intake (SP+ABI). Those are much more numerous in the folktales than in the recount, for a roughly similar number of pausal units.

More precisely, in Folktale1, of all ABI, 60% are preceded by a silent pause while 40% occur alone. In Folktale2, 74% are preceded by a silent pause, 26% occur alone. In the Recount, 8% are preceded by a silent pause, 92% occur alone.
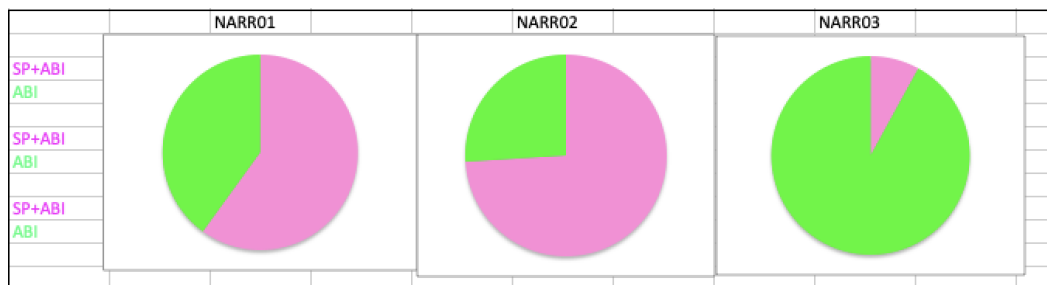
Figure D: Ratio of standalone ABI to SP+ABI (out of all ABI) in the two folktales and the recount

Those observations point to important genre differences within the monologues, between traditional folktale storytelling and the other type of monologue represented in the corpus, where recollected memories are intertwined with generalizations about life in the old days versus contemporary life. The frequent association of ABI to silent pauses characterizes the folktales and differentiates them from the recount. The question is, then: what difference between the folktales and the recount could explain the different patterns in the use of audible breath intakes in the two genres?

3.2 IU boundary tone before ABI vs SP

In the whole corpus, the boundaries of non-pausal intonation units were annotated as non-terminal (= continuing), terminal, or truncated (the latter following a disfluency or false start), based on acoustic and perceptual cues.

Table 4: Types of intonation units

	Non-pausal IUs	Non-terminal boundary /	Terminal boundary //	Truncated IU #
FOLKTALE 01	614 (100%)	401 (65%)	191 (31,5%)	22 (3,5%)
FOLKTALE 02	546 (100%)	327 (60%)	208 (38%)	11 (2%)
RECOUNT 03	794 (100%)	588 (74%)	174 (22%)	32 (4%)

The folktales have less intonation units than the recount, but more terminal boundaries, whereas non-terminal boundaries are comparatively more numerous in the recount. This points to a different narrative organization, with more clearly delineated sub-episodes or subtopics in the folktales than in the recount.

Depending on the type of pause (SP, ABI, or SP+ABI), the nature of the preceding boundary (terminal, non-terminal, or truncated) is different. Table 5 shows the number of pauses of each type preceded by terminal or non-terminal boundaries, or truncated intonation units.

Table 5: Nature of the boundary preceding the pause (ABI, SP or SP+ABI)

	ABI alone	SP alone	SP+ABI
Folktale 1 non-terminal /	33	75	17
Folktale 1 terminal //	19	44	70
Folktale 1 truncated #	6	0	0
Folktale 2 non-terminal /	21	63	22
Folktale 2 terminal //	15	44	82
Folktale 2 truncated #	0	1	0
Recount non-terminal /	85	83	0
Recount terminal //	23	51	10
Recount truncated #	6	0	0

Here, again, the recount and the folktales have different profiles, with a strong tendency for standalone ABI to follow non-terminal (rather than terminal or truncated) IUs in the recount, and a strong tendency for complex SP+ABI pauses to follow terminal (rather than non-terminal or truncated) IUs in the folktales.

4 Discussion

4.1 Role of Audible Breath Intakes in relation to previous research literature

4.1.1 Turn-taking management
In conversation data, inbreaths have been shown to play a role in turn taking management (Torreira, Bögels and Levinson, 2015; Kendrick and Torreira, 2015). The fact that they also appear in monologues, where turn-taking is non-applicable, is evidence for their multifunctionality. However, this does not mean that the function of ABI in monologues is not interactional: monologues are not soliloquies and they occur for and in front of an audience, whose reactions are monitored, anticipated, and possibly, manipulated. Therefore, even if there is no turn-taking management in a monologue, there is definitely interactional management, and this might well be signaled by audible breath intakes.

4.1.2 Disfluencies and planning
There are several types of disfluencies in spoken data. Among them, false starts (resulting most of the time in truncated intonation units), as well as vocalized hesitations.

The latter have been found to correlate with the presence of breath intakes by Rochet-Cappellan and Fuchs (2013), as well as Torreira, Bögels and Levinson (2015). Table 6 below, however, does not support this correlation for all our data. In order to distinguish influence of hesitations proper from influence of other disfluencies, hesitations occurring in non-truncated IUs have been considered independently of hesitations occurring in truncated ones. For each category, co-occurrence with ABI, in the immediately preceding or following intonation unit, was investigated.

Table 6: Hesitations and their environments

	Total HESIT[3]	In truncated IU and/or associated with false start	Preceded by ABI	Followed by ABI	In terminal // and non-terminal / IU	Preceded by ABI	Followed by ABI
NARR01	18	**12**	5	3	**5**	2	1
NARR02	10	**2**	0	0	**8**	1	1
NARR03	97	**8**	1	0	**87**	38	16

One striking observation is, again, the difference between the recount and the folktales: for relatively similar durations, the recount yields about five to ten times more hesitations. This probably reflects the degree of pre-planning in both genres: folktales have been told and re-told, and are thus liable to come out in a more fluid way, whereas the recount, even if it also contains parts that have already been told, is more unpredictable and relies less on memorization and routines.

As for the correlation between hesitations and ABI, it is observed only in the case of the recount: 62% (38+16) of hesitations occurring in non-truncated IUs (87) are either preceded or followed by an ABI. This supports findings by Rochet-Cappellan and Fuchs (2013), and Torreira, Bögels and Levinson (2015), that vocalized hesitations tended to be preceded by deeper inhalations in their data. But more than that, it allows a finer-grained observation: ABI tend to occur together with hesitations only in unplanned speech. In that type of speech, they might signal the intention of the speaker to keep the floor against possible interruptions, despite the fact that she is experiencing formulation difficulties.

In traditional storytelling, ABI cannot be motivated by a wish to hold the floor despite disfluencies: first of all, as mentioned earlier, disfluencies are rare due to the planned nature of the discourse; moreover, the floor is a priori given to the speaker till the end of the folktale.

The role of ABI in unplanned speech seems different from the role they have in planned speech such as traditional storytelling. It would be interesting to see whether other types of planned speech (political speeches for instance) behave differently from unplanned speech in that respect.

As for truncated IUS and false starts, Table 6 shows that there is no correlation with audible breath intakes. This seems to support the conclusions of the study by Torreira, Bögels and Levinson (2015).

4.1.3 Sociolinguistic motivations

Winter and Grawunder (2012) showed that 'loud 'hissing' breath intakes' in Korean correlate with formal speech. 'Formal' here refers to a register that "has to be used when addressing strangers or superiors", and is "a normative form of politeness" involving the use of honorific forms (Winter and Grawunder, 2012:808).

In that precise sense, it is clear that the Kabyle data is not formal, and thus does not support the hypothesis that holds for the Korean data: the three monologues (like the conversation) are told in a familiar setting, to a small audience (four listeners) composed of friends and family. The three recordings nevertheless feature a number of audible breath intakes.

There is however a feature of ABI in the monologues which might be shared with the formal Korean conversational use of loud hissing breath intakes: control over the interaction.

---

[3] Total number of hesitations is higher than number of IUs in which they occur because some rare IUs have more than one hesitation markers in them. Some IUs in which there is a hesitation marker may be both preceded and followed by an ABI, or there may be no ABI in the vicinity.

Indeed, in the folktales as well as in the recount, the speaker signals that she is steering the narrative, and keeping the listeners focused on specific parts of her discourse and storytelling. This might be expressed, at least partly, by the audible breath intakes.

4.1.4 "Expressiveness"

Yuan and Li (2007) reports effects of expressiveness linked to audible breath intakes in Japanese, where the number of breath segments in expressive speech is 50% higher than in that of neutral read speech in the same text. In that paper, expressiveness is defined as "expression of emotion or attitude" (Yuan and Li, 2007:19), emotion being labelled as "positive", "neutral" or "negative", and attitude as "excited", "steady" and "low" (Yuan and Li, 2007:20).

Although our data does not allow the comparison of renditions of the same text, one can say that both the folktale and the recount are "expressive", insofar as they express the speaker's emotions and attitudes about changes in her way of life in the case of the recount, and the characters' emotions and reactions to the various life-threatening adventures they undergo in the folktales. The Kabyle data in the present study would therefore apparently support the findings of Yuan and Li (2007). However, this should be tested more precisely, by investigating the precise emotional load or attitudinal stance of utterances preceded or followed by ABI.

The various observations in part 4.1 show that ABI seem to have different functions (or show different correlations) in different languages, and that as a consequence, they are not to be considered as mere physiological[4] phenomena or universal iconic signals, but that they are functional, language-dependent (and in our data genre-dependent) markers.

4.2 Audible Breath Intakes in the Recount vs the Folktales

One of the most robust findings of this study is the clear distinction between standalone ABI in the recount, and complex SP+ABI pauses in the folktales. No study in the literature reported on such complex pauses, and it is therefore impossible to know whether they were simply overlooked (and both standalone ABI and complex SP+ABI treated as one phenomenon), or whether the complex SP+ABI pause is characteristic of Kabyle folktales, or more generally, of traditional storytelling, or highly formalized (or argumentative) types of discourse.

Some regularities in the contextual distribution of standalone ABI and SP+ABI pauses are presented below, but those are only preliminary observations, and a follow-up paper devoted to the systematic pragmatic and semantic analysis of the contexts of occurrence of all audible breath intakes in the corpus is in preparation. Audible breath intakes (ABI) are marked in blue, inbreaths that are almost inaudible or only slightly audible (INSP) are in green, and complex pauses [SP+ABI] are marked in pink. Standalone silent pauses (SP) are simply bolded.

---

[4] By physiological, in response to an anonymous reviewer's comment, I mean 'governed only by the need to breathe at given intervals, in order to provide the oxygen necessary for the body to survive'. Speech breathing, in this perspective, is non-physiological, because breathing is also governed by other factors, mainly the position of pausing linked to its interaction with speech.

4.2.1 The Recount

The Recount is characterized by frequency of standalone ABI preceded by non-terminal boundaries, [/ABI]. The general layout of the recording can be described as a series of remarks, not unlike the strokes of a paintbrush, contributing to a portrait of life in the old days for a Kabyle woman, as compared to her life in our modern period. Most of the time, the remarks are presented in a serial format, with a list intonation, which explains the high number of non-terminal boundaries. Some intonation units follow each other without a silent pause or an ABI, and some are separated by a pause, an ABI, or more rarely, a complex SP+ABI pause (generally after a terminal boundary).

A typical context for the occurrence of an ABI after a non-terminal intonation unit is the beginning of a clause, either a main clause or a subordinate one (line 5), especially one beginning with a conjunction (*baʃ*, 'so that', *ma* 'if', *mi* 'when'). Clauses beginning with an adverb such as *zik* 'in those days' (line 1) are also often preceded by an ABI. ABI are often followed or preceded by a hesitation marker (line 6), as shown in Table 6. All those cases are represented in the following excerpt:

1- ABI_311 zik nkki ʃfiɣ-dd / nttʕiʃʃi / **263** ulaʃ trisiti-agi // INSP_663 nʃaʕlaj lamba n lgaz // **610**
ABI_311 in those days I remember / we lived / **263** there wasn't this electricity // INSP_663 we used to light a gas lamp // **610**

2- ad-dd ## ad-tt nʃʕl akka / d lamba / ad-tt nʧʧrˤ d lgaz / ABI_489 ad txdm akka stti taftilt / ABI_459
we used to light it thus / it was a lamp / we would fill it with gas / ABI_489 my grandmother would prepare a wick / ABI_459

3- ad-tt tʃʕl ə::: / ttwaliɣ ar ɣurs dg jidˤ // 317 ABI_566 ə::: / diɣnni / **341** tamʕiʃt n zik / ak° d tin n tura /
she would light it ehm / I would watch it at night // 317 ABI_566 ehm / again / **341** life in the old times / and life now /

4- maʧʧi kifkif // **285** zik ʃfiɣ-dd ə::: / tamtˤtˤut n lqbajl / ad-dd tkkr / ABI_323
they're different // **285** in the old days I remember ehm / the Kabyle woman / she would get up / / ABI_323

5- ad tṛuħ ad-dd tzdm / ad-dd tawi isɣarn g wdrar / ABI_461 baʃ ad-dd tawdˤ /
she would go gather wood /she would bring branches from the mountain / ABI_461 to bring them home /

6- ad-dd tʃʕl tims i warraw-is / INSP_260 ulaʃ ə::: / lifurnu-agi n trisiti / ulaʃ ə::: / ABI_372
she would lit a fire for her children / INSP_260 there was no ehm / none of those electric stoves / there was no ehm / ABI_372

7- lmazuṭ-agi / ulaʃ / ħaʃa ajn ara-dd tawi / dg wdrar / af wʕruris /
this fuel oil / it didn't exist / there was only what she gathered / from the mountain / and carried on her back /

8- ad-dd tawi isɣarn / 181 ABI_355 baʃ akkn ad ssħmun / warraw-is ar ɣurs i ʃtwa / ABI_742
she would gather wood / 181 ABI_355 so that they could keep warm / her children in her home in the winter / ABI_742

The excerpt however also provides examples of hesitations not associated with ABI (lines 3, 4), and of clause onsets not preceded by ABI. Some additional parameters must be found in order to provide more precise contexts for standalone ABI, and possibly, one or several functions.

A study of intervals between all audible respirations in the excerpt shows that their duration is between 1567 and 6105 ms. Intervals between ABI are longer, they span from 2130 to 13990 ms. There is no regularity in ABI intervals, and physiological factors therefore have to

be excluded (physiological respiratory rate for an adult is between 12 and 18 inspirations per minute on average, which means one inspiration every 3300 to 5000 approximately).

No clear unique factor seems to emerge from the Recount data, as an explanation for the occurrence of audible breath intakes, and it may well be the case that ABI do not have a function in themselves, but acquire it in some environments, or by entering in constructions as a component of compositional meanings or functions.

4.2.1 The Folktales

This would explain why it is easier to find regularities for the [//SP+ABI] complex pause (silent pause preceding an audible breath intake, after a terminal boundary), which can be considered as a prosodic construction. A frequent context of occurrence for [// SP+ABI] is a narrative articulation, for instance between the end of the ritual introductory formula and the introductory words of the tale. This sequence also appears between essential moves in the narrative, not necessarily long sequences, but clear articulations in the tale. For instance, in the following excerpt from Folktale 1, an [//SP+ABI] sequence appears between:

- the situation which is the starting point of the tale: a widower with seven daughters at home, an unmarried woman in the village (lines 2 to 5)
- the woman visiting the little girls asking them to tell their father to marry her (lines 6 to 7)
- the little girls asking their father to marry the woman (lines 7 to 9)
- the refusal of the father (lines 10 to 11)

1- "amaʃaħu // 519 ABI-399 win-dd innan aħu // **333** tamaʃaħutt-iw ad tlħu / ad tffɣ annʃt usaru // 697 ABI-501
"O Tale // 519 ABI-399 He who says "ahu" // **333** My tale will be beautiful / it will come out as a braid // 697 ABI-501 "

2- jiwn wass sg wussan n rˤbbi a Amina / illa jiwn / isˤa sbˤa jssi-s // **640** tmmut jmma-tsnt // ABI_409
Once upon a time, Amina / there was a man / he had seven daughters // **640** their mother had died // ABI_409

3- illa d arˤrˤaˤi // 274 ikss g wdrar // 243 isˤa taqdˤit / INSP_445 ikss / INSP_588
he was a shepherd // **274** he took his herd to pasture in the mountain // **243** he had a herd / INSP_445 he took it to pasture / INSP_588

4- jssi-s-nni sswwajnt-as g wxxam / ttɣimnt jids / i sbˤa jid-snt // 702
his daughters prepared his meals at home / they stayed with him / the seven of them // **702**

5- jiwn wass sg wussan n rˤbbi / tlla akka jiwt / ur tzwiʤʤ ara / i taddart-nni // 451 ABI-438
Once upon a time / there was a woman / she was not married / in the village // 451 ABI-438

6- tttṛuħu-dd ar jssi-s / tnna-as ad-s tinimt i baba-tk°nt /ad-iji jaɣ / INSP_338
She regularly visited the girls / she told them 'you will tell your father /to marry me' / INSP_338

7- ad-k°nt xdmɣ lxirˤ // 296 ad-k°nt əɣ# gɣ lqṛarˤ // 607 ABI-566
I will be good to you //   I will keep you safe.' //

8- baba-s-nni / mi ara-dd jawdˤ tamddit ad-s inint a baba / ma jħdak rˤbbi /
Their father / when he came back in the evening they would tell him 'father / please /

9- tura ilaq ad tzwʤʤdˤ // INSP_493 dajn / nkknti mqqrit / jrna nħwʤʤ tamtˤtˤut ara-ɣ iwansn // 461 ABI-547
now you must get married // INSP_493 it's over now / we're big girls / and moreover we need a woman to keep us company' // 461 ABI-547

10- ad-s jini a jlli ur zwwʤʤɣ ara / ugadɣ ad-k°nt-idd awiɣ tamtˤtˤut / ara-k°nt tkrfi /
He would tell them 'my daughters I won't marry / I'm afraid of bringing you a woman / who will hate you/

11- ara-k°nt txdm lbatˤl u# / **371** ur ilaq ara // 443 ABI-557
who will be unfair to you u# 371 this must not happen' // 443 ABI-557

However, there are a number of cases that need more thorough investigations. For instance, the first [//SP+ABI] above appears within the ritual opening formula: is that a delayed pause that should have appeared before *amaʃaħu*? Similarly, in the following excerpt from the same folktale, an [//SP+ABI] appears before an incident remark by the storyteller (line 2). This is not a move in the narration, although it can be seen as an articulation, providing the necessary background for the interpretation of the father's oath.

1- inna-as ifii / wlˤlˤafi a jssi / ur-dd zwiʤʤɣ / ABI-363 alamma tkks-dd / faṭima tuħriʃt /**326**
he said "so / by God, my daughters / I won't marry / ABI-363 until she manages to grab / Clever Fatima / **326**

2- aɣrˤum g dkk°an // 473 ABI-253 fatˤima tuħriʃt-agi / d jlli-s i isˤa / d tamʃtiṭuħt / ABI-316
the bread on the shelf"// 473 ABI-253 This clever Fatima / she was his daughter / she was very little / ABI-316

3- inna-as alamma tttawdˤ / ad-dd tkks akka aɣrˤum / ABI_375 maħsub / ma d# d jiri tamtˤtˤut-nni n baba-s /
he said "until she manages / to grab the bread thus / ABI_375 that's to say / if her stepmother was a bad woman /

4- tzmr ad-dd tkks ad tʧʧ //
the girl would be tall enough to feed herself //

There are also cases where the complex [SP+ABI] pause occurs after a non-terminal boundary, and situations where ABI appears on its own. Finally, intervals between respirations are between 810 and 7469 ms in the first folktale excerpt; and they are between 3149 and 7469 when only ABI are considered. No physiological explanation explains everything here either.

5 Conclusion

The analysis conducted on the data distinguishes between discourse types on the one hand (dialogue vs. monologue) and within monologues, between the folktales and the recount. The study being perceptual and acoustic, nothing can be said of, for instance, the actual amplitude of breath intakes (and quantity of air in the lungs) in relationship to audibility. Only the perceived audibility of intakes, acoustically measured, as well as their structure, composition and duration, were analyzed.

Based on that analysis, the recount is clearly characterized by the use of standalone audible breath intakes after non-terminal prosodic boundaries, and by the association of audible breath intakes and hesitations. The folktales, on the other hand, are characterized by the use of complex pauses, composed of an audible breath intake preceded by a silent pause, following a terminal prosodic boundary. Those complex pauses are not only subtle in their composition, they also involve much more than a physiological need to breathe (which can be accommodated by silent inbreaths as well as audible ones), and more materials and structure than what is needed for the speaker to bide for time while she reformulates her speech after a hesitation or

false start, or to keep the floor (the last two being probable factors in the occurrence of standalone audible breath intakes in the recount).

To what crucial difference between the two genres can we associate the different distributions and correlations observed, namely [/ABI] in the recount vs [// SP+ABI] in the folktales? The answer may well be the difference in degree of planification: folktales are typically planned, rehearsed, well-known, they tend to come out in a fluid way, with few hesitations, and they conform to a narrative schema. The recount, even if it contains parts that have already been told, is less planned and has no pre-existing structure, it relies less on memorization and routines. It is therefore more liable to contain markers of online processing, rather than signs of anticipated organization of speech stretches.

I propose to attribute the differences in frequencies of [/ABI] vs [// SP+ABI], at least in part, to those differences in planification: the preliminary study conducted in part 4.2 seems to point at a use of [// SP+ABI] for the delimitation of episodes or narrative movements. A more fine-grained study of prosodic contours should establish whether [// SP+ABI] are indeed paratone (=oral paragraph) markers. [/ABI] on the other hand appear in a number of contexts, and no clear-cut and unique function is visible so far. However, the acoustic and perceptual profile of ABI (sustained and constant semi-constriction of the vocal tract, without full closure, with emission of an audible sound) points at their use as signals for the co-speaker/listener rather than just speaker-centered processing units, or physiological ones: both those last functions would be perfectly realized with silent pauses. I suggest that the general function of the audibility of breath intakes, as opposed to silent or semi-silent breathing, is to regulate interaction by indicating to the interlocutors that the speaker is monitoring the discourse or narrative.

It would then be possible to link together the various findings in previous literature, summarized in 4.1, and attribute them to that overarching interactional function. The details of the way in which those audible signals are interwoven with articulated speech and other regulation and processing markers and devices, such as hesitations, false starts, chunking, etc., as well as their composition with other pause-types, would then correspond to various realizations of the structuring of spoken interactions (monologal as well as multilogal). They would span a whole array of combinations, varying from simpler and less conscious associations, to more complex and controlled structures. And they would cover a number of domains, from parsing instructions to the expression of attitudes and emotions.

As far as annotation and segmentation are concerned, the study shows how important it is to annotate not only audible breath intakes, but also complex SP+ABI pauses. It is also important to record data in natural settings, with an audience, so that interaction is always at play.

Finally, the lack of references in the literature on complex SP+ABI pauses might be due to the fact that they were overlooked, but also to the fact that this kind of monitoring of storytelling is a skill that speakers who belong to communities where oral tradition is still vivid still maintain, whereas storytelling by speakers who do not belong to those traditions feature much less fine-tuning of the prosodic organization of the narrative.

REFERENCES

Barbosa, P., Madureira, S. The Interplay between Speech and Breathing across three Brazilian Portuguese Speaking Styles. *Proc. 9th International Conference on Speech Prosody 2018*, 369-373, DOI: 10.21437/SpeechProsody.2018-75. 2018.

Boersma, P., Weenink, D. *Praat: Doing phonetics by computer* [Computer program 1992-2017], http://www.praat.org.

Chaker, S. Données exploratoires en prosodie berbère I: l'accent en kabyle, *GLECS*, XXXI, 1995/a, p. 27-54. 1995.

Chaker, S. Données exploratoires en prosodie berbère II: l'intonation kabyle, *GLECS*, XXXI, 1995/b, p. 55-82. 1995.

Chanard, C. Lexicon-aided annotation in ELAN. In: Amina Mettouchi, Martine Vanhove and Dominique Caubet (Eds), *Corpus-based Studies of Lesser-described Languages*: The CorpAfroAs corpus of spoken AfroAsiatic languages, Studies in Corpus Linguistics 68, 311-332. Amsterdam-Philadelphia: Benjamins. 2015.

Couper-Kuhlen, E. *English Speech Rhythm:* Form and function in everyday verbal interaction. Amsterdam-Philadelphia: John Benjamins, 1993.

Fuchs, S., Petrone, C., Krivokapic, J., Hoole, P. Acoustic and respiratory evidence for utterance planning in German. *J. Phon.* 41, 29–47. 2013.

Jefferson, G. Transcription Notation. In: Atkinson, J.; Heritage, J. (Eds) *Structures of Social Interaction*. New York: CUP, 1984.

Kendrick, K. H., Torreira, F. The timing and construction of preference: a quantitative study. *Discourse Processes,* 52:4, 255-289. 2015. DOI: 10.1080/0163853X.2014.955997.

Mc Farland, D. H. Respiratory markers of conversational interaction. *J. Speech Lang. Hear. Res*. 44, 128–143. 2001.

Mettouchi, A. Aspect-Mood and discourse in Kabyle (Berber) spoken narratives. In D. Payne & S. Shirtz (eds) *Beyond Aspect: The expression of discourse functions in African languages.* John Benjamins: Amsterdam-Philadelphia. 117-144. 2015.

O'Connell, D., Kowal, S. Some current transcription systems for spoken discourse: a critical analysis. *Pragmatics* 4:1, 81-107. 1994.

Rochet-Capellan, A., Fuchs, S., The interplay of linguistic structure and breathing in German spontaneous speech. In: *Proceedings of Interspeech*, 1128–1132. 2013.

Schegloff, E. A. *Sequence Organization in Interaction*.Vol.1. Cambridge: CUP, 2006.

Scobbie, J.M., Schaeffler, S., Mennen, I. Audible aspects of speech preparation. *Proceedings of ICPHS17*, Hong-Kong, 17-21 August 2011, 1782-1785. 2011.

Torreira, F., Bögels, S., Levinson, S. C. Breathing for answering: the time course of response planning in conversation. *Frontiers in Psychology* 6. 1–11. 2015.

Winter, B., Grawunder, S. The phonetic profile of Korean formal and informal speech registers. *J.Phon*. 40, 808-815. 2012.

Wittenburg, P., Brugman H., Russel A., Klassmann A., Sloetjes, H. "ELAN: a professional framework for multimodality research,". *Proceedings of LREC 2006, Fifth International Conference on Language Resources and Evaluation* (Genoa). 2006.

Yuan, C., Li, A. The breath segment in expressive speech. *Computational Linguistics and Chinese Language Processing* 12, 17–32. 2007.