A multimodal analysis of spoken medical English in expert-to-expert interaction in TV programmes[1]

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Abstract

The present paper intends to investigate oral communication between professionals in medical contexts. Apparently, this is quite a neglected area of research in the abundant literature on spoken medical English, which mainly focuses on doctor-patient encounters. Due to the difficulty in finding available data on real sequences in this domain, this study aims to analyse this type of specialised discourse, within the Multimodal Analysis framework and with a holistic approach, in two different American TV products, namely the medical drama *Code Black* (M. Seitzman, 2015-present), well known for its plausibility and verisimilitude as far as medical procedures are concerned, and the medical docu-series *Boston Med* (2010). On the verbal level, special attention will be paid to vocabulary, speech acts, register variation according to the participants' role and to the level of emergency of the situation. Moreover, and most importantly, analysis will be carried out also on the non-verbal level through the multimodal annotator software ELAN (Wittenburg, Brugman, Russel, Klassmann & Sloetjes, 2006), thus integrating verbal and non-verbal cues (e.g. gaze direction, hand/arm gestures, etc.) to show how a multimodal approach can actually help to interpret a message, especially in situated communicative and specialised contexts.

Keywords: medical English; multimodality; spoken interaction; expert-to-expert conversation; TV series.

Resumen

Análisis multimodal del inglés medico oral en interacciones entre expertos en programas de televisión

Este artículo investiga la comunicación oral entre profesionales de la Medicina, un tipo de interacción que ha generado poca investigación dentro de la

abundante bibliografía sobre el inglés médico hablado, centrada fundamentalmente en los encuentros médico-paciente. Debido a la dificultad que entraña obtener datos de interacciones reales en este ámbito, el presente trabajo estudia este tipo de discurso especializado, desde el marco teórico del Análisis multimodal y con un enfoque holístico, en dos productos audiovisuales de la televisión americana: la serie *Code Black* (M. Seitzman, 2015-actualidad), conocida por la verosimilitud de sus procedimientos médicos, y la serie documental *Boston Med* (2010). Desde un punto de vista verbal, se prestará especial atención al vocabulario, a los actos de habla y las variaciones de registro según el papel de los participantes y el grado de emergencia de la situación. Además, y como objetivo principal, se llevará a cabo un análisis en un nivel no verbal a través del programa de anotación multimodal ELAN (Wittenburg, Brugman, Russel, Klassmann & Sloetjes, 2006), integrando de este modo los aspectos verbales y no verbales (dirección de la mirada, gestos, etc.) para mostrar cómo un análisis multimodal puede, de hecho, ayudar a interpretar el mensaje, especialmente en contextos situados comunicativamente y especializados.

Palabras clave: inglés medico; multimodalidad; interacción oral; conversación entre expertos; series de televisión.

1. Introduction

There is a wide body of literature on spoken medical English (cf., inter alia, Gotti & Salager-Meyer, 2006; Ferguson, 2013; Salager-Meyer, 2014) and an extensive part of it focuses on doctor-patient interaction (cf. Fong Ha & Longnecker, 2010, for a review). However, perhaps due to the limited availability of authentic data, there has so far been little attempt to study specialised discourse between professionals. To this end, some TV products provide a wide repertoire of situations and conversational exchanges (Nagy, 2010), including expert-expert interaction, that can be investigated on different levels. Moreover, audiovisual products in general are multisemiotic in nature, which means that each mode contributes to the meaning-making process, and thus have widely proven to be ideal material both for research purposes (e.g., conference paper presentations in Querol-Julián, 2011, films in Bonsignori, 2016, academic lectures in Crawford Camiciottoli, 2016) and for teaching. In the latter case, an example is represented by films which, despite their fictional character, have often been used in the context of language learning (cf., Sherman, 2003; Kaiser & Shibahara, 2014; Bonsignori, 2018) because they are actually considered as "authentic source material (that is, created for native speakers and not learners of the language)" (Kaiser,

2011: 233). Moreover, several recent studies have demonstrated the similarities between film language and spontaneous face-to-face conversation in terms of authenticity and spontaneity (Kozloff, 2000; Forchini, 2012; Bonsignori, 2013). This notion can also be extended to the recent high quality TV series broadcast since the beginning of the 2000s by networks such as HBO, AMC, and the online distributor Netflix. Indeed, TV dialogue is a subtype of "scripted/constructed dialogue" (Bednarek, 2010: 63) written to sound natural and believable. Particularly interesting is the case of TV products that portray specialised and professional communicative contexts such as medical dramas, which are not only entertaining, but also accurate in their staging of realistic situations (cf. Shevell, Thomas & Fuks, 2014; Stanhope, 2015; McGann, 2015), and medical documentaries.

The present paper intends to analyse spoken medical English as a type of specialised discourse focusing on expert-to-expert interaction in the American TV series *Code Black* (M. Seitzman, 2015-present) and in the American medical docu-series *Boston Med* (2010). Some selected clips with relevant communication exchanges that portray different medical contexts will be analysed within the multimodal analysis framework (Jewitt, 2014). Indeed, since the pioneering work by Kress and van Leeuwen (1996) and Lemke (1998), the importance given to the various semiotic resources in meaning making has become pivotal and a key concept in Multimodal Discourse Analysis (cf. O'Halloran 2004; Scollon & Levine 2004; Norris 2004). More specifically, a communicative event in a given situational context cannot be analysed solely by taking into account the verbal element, as also non-verbal cues such as hand/arm gestures, gaze direction, head movements, body posture and proxemics in general greatly contribute to supporting, integrating and creating meaning.

The importance of non-verbal communication has been recognised also in medical contexts, especially in physician-patient interactions (cf. Robinson, 2006) and the Multimodal Analysis framework has been applied in recent studies on this topic (Franceschi, 2017a), also with teaching implications (Franceschi, 2017b, 2018). However, what is currently missing is a holistic investigation of expert-to-expert communication in medical contexts, and the present paper aims to bridge this gap by giving an overview of different situations. Therefore, some selected clips were analysed on the verbal level, with special attention to vocabulary, speech acts, register variation according to the participants' role (e.g., attending/resident, doctor/nurse, doctor/paramedic vs. peer-to-peer), and to the level of emergency of the

situation (e.g., a medical procedure urgently performed in the ER, or Emergency Room, vs. in the OR, or Operating Room). Moreover, and most importantly, analysis was carried out also on the non-verbal level through the multimodal annotator software ELAN[2] (Wittenburg, Brugman, Russel, Klassmann & Sloetjes, 2006), thus integrating verbal and non-verbal cues to show how a multimodal approach can actually help to interpret a message, especially in situated and specialised communicative contexts.

2. Material and Methods

Eight clips of different duration, ranging from 1 to 4 minutes approximately, were selected and cut from the first two episodes of Season 1 of the American TV series *Code Black*[3] (M. Seitzman, 2015-present) and from the first episode of the docu-series *Boston Med*[4] (2010), i.e., 5 and 3 clips, respectively. The choice of analysing sequences from these two TV products specifically lies in the need to investigate how interaction between professionals is represented in different medical contexts.

More specifically, *Code Black* is an American medical drama premiered on CBS in 2015, which is based on the 2013 prize-winning documentary with the same title by Ryan McGarry (physician and director). It is set in the most famous ER in the USA (Stanhope, 2015), at Los Angeles County Hospital, where the expression "code black" is the colour-code indicating an overflowing ER waiting room. In effect, the TV series follows the staff of doctors who have to treat patients under extremely difficult circumstances, as the ER is always overcrowded with patients but severely understaffed. The situations displayed are mainly professional, while doctors' private lives, even though present, are given less importance, which makes the show perfect for research purposes. Indeed, this element, together with the fact that the series takes great inspiration from the original documentary, that 30 trained nurses were present as background actors, and that the actors were highly trained in order to perform the medical procedures (Stanhope, 2015), make this TV show less fictional, so to say, compared to other medical TV series such as *Grey's Anatomy*, for example, where much space is granted to romance and to the characters' life outside the hospital.

Boston Med is an American medical docu-series that debuted on ABC in 2010. It was filmed over a four-month period and it follows the stories of the medical staff, the patients and their families at three main hospitals in

Boston: Massachusetts General Hospital, Brigham and Women's Hospital, and Children's Hospital. Each episode focuses on three or four stories, i.e., clinical cases, with different degrees of life-threatening illnesses or injuries. As a documentary series, medical cases and "real" interactions are interrupted by interviews with doctors and patients, which are basically aimed to better explain a medical procedure or a condition to the viewer.

The clips were cut based on three different medical contexts that were identified in a previous study on spoken medical English in TV series (Bonsignori & Vignozzi, 2017): 1) arrival at the ER, 2) discussion of the clinical case, and 3) medical procedure, either in the ER or in the OR. For the purposes of the present study, attention was paid only to conversational exchanges between professionals. Thus, to sum up, each sequence was analysed taking into account the situational context, the level of emergency, and the participants' role (e.g., attending/resident[5], doctor/nurse, doctor/paramedic vs. peer-to-peer). Based on these parameters, an integrated, multimodal analysis of relevant and selected scenes was carried out using the multimodal annotator software ELAN, which enables the analyst to simultaneously investigate both verbal and non-verbal cues. Therefore, linguistic features such as specialised vocabulary, speech acts, and register variation were investigated alongside hand/arm gestures, gaze direction, facial expression, head movements, body posture, as well as intonation, in the attempt to give a holistic description of oral communication in situated and specialised contexts. A further aim of the multimodal analysis is to highlight how non-verbal elements can also contribute to delivering and understanding a message. Indeed, multiple tiers can be created in the software which can be filled in with analytical information through the use of labels, i.e., "controlled vocabulary", as shown in Table 1 below as an example:

TIERS	CONTROLLED VOCABULARY	
	Abbreviation	**Description**
Transcription		
Gesture_description	Ff	Forefinger forward
	Pu	Palm up
	PuMf	Palm up moving forward
Gesture_function	indexical	to indicate position
	modal	to express certainty
	parsing	to mark different units within an utterance
	performative	to indicate the kind of speech act
	representational	to represent an object/idea
	social	to emphasize/highlight importance
Gaze	up	up
	back	back
	down	down
	LaI	Looking at interlocutor
	out	out
	side	side
Face	frowning	frowning
	smiling	smiling
Head	QN	quick nod
	MdS	Moving down to one side
Prosody	stress	paralinguistic stress
Notes		description of camera angles, audience reaction

Table 1. Example of the multi-tiered analytical structure created in the ELAN software.

In detail, the transcription of the characters' speech can be found in the Transcription tier. In clips with more than one interlocutor, the corresponding number of Transcription tiers was created in the software. This is also useful to notice cases of interruptions, overlapping, long pauses, and so on, thus visually shaping the pace of the conversation itself. The gestures used by the various participants were annotated and described in the Gesture_description tier, using labels on the basis of Querol-Julián's (2011) model, whereas their functions were indicated in the Gesture_function tier, following Kendon (2004) and Weinberg et al.'s (2013) classifications. Other labels referring to information regarding gaze direction, facial expression and head movements were inserted in the corresponding tiers, as well as the occurrence of prosodic stress on certain words in the Prosody tier. Finally, the Notes tier was devoted to annotations regarding relevant information in the TV genre, such as camera angles. Indeed, it is important to bear in mind that sometimes, when the character is speaking, the camera may not be focusing on him/her, but on another character to show his/her reaction, for example. Therefore, in these cases it is not possible to take into account the speaker's non-verbal cues in the analysis (cf. Bonsignori, 2016).

3. Analysis

The following sections are devoted to the multimodal analysis of either relevant sequences in the selected clips or the entire clips portraying one of the three medical contexts previously identified (cf. section 2), namely arrival at the ER, medical procedure in the ER and in the OR, and finally, discussion of the clinical case. Each clip was also fully transcribed.

3.1. Arrival at the ER

The first medical context under investigation is the moment in which a patient arrives at the hospital by ambulance, that is, when he/she is taken to the ER by paramedics. Generally, the patient lies on a gurney and may be either conscious or unconscious, depending on the gravity of his/her condition. However, the level of emergency is quite high, which reflects on the language used. In effect, upon arrival, the paramedic staff have to quickly describe to the doctors the patient's conditions, in order to enable them to take action promptly. Therefore, the communicative event is characterised by syntactic and morphological reduction and the style is telegraphic. This is clearly shown in the first part of clip 1 from episode 1 (00:00:53) of *Boston Med* (also *BM*), where the medical staff are assisting a patient who has just been taken to the ER of Massachusetts General Hospital. They move him from the gurney to the bed while carefully listening to the paramedic's description of the case. The transcription is provided in the example below, with numbers on the left indicating each turn.

	BOSTON MED: CLIP 1	
1	ALL	One, two, three
2	PARAMEDIC (man) to Doctors [gesture]	Ø Thirty-two year old male. Ø Police officer, Ø robbery attempt, Ø was shot, what they appear to be two times, one in the right *wrist*, which appears to be *a through and through*, and, uh, just under the right side of his [*lower jaw*].
3	DOCTOR (woman) (voice)	He got shot here, too.
4	DOCTOR (man)	The left pinkie, basically.
5	PARAMEDIC (man) to doctors	Ø *Blood loss* estimation was about 300 *ccs* by *EMS*. Ø Pain right now is about a seven out of ten.
6	DOCTOR (woman)	*Breath sounds* are full and equal bilaterally. His *airway* is intact. He has a palpable *femoral pulse*.

As can be noted, the description delivered by the paramedic in turns 2 and 5 is characterised by substantial syntactic reduction and fragmentation, with

the use of ellipsis and the deletion of the definite article *the*, both indicated by "Ø". Morphological abbreviations are also used such as the two initialisms *ccs*, i.e., "cubic centimetres", the unit of volume to measure blood loss, and *EMS*, standing for "Emergency Medical Service". The doctor's comment in turn 6 consists of a sequence of simple sentences in order to give the clearest account possible of the patient's conditions. Specialised vocabulary is employed by both speakers, which is highlighted in italics in the transcription, as well as jargon, i.e., *a through and through*, to describe the type of gunshot wound.

As regards the non-verbal cues, it is worth noting that the camera angles often change, first focusing on one doctor, then on the paramedic or the patient's face, thus reflecting the hectic and tense atmosphere. As a consequence, when the paramedic speaks in turn 2, his close-up con be only seen in the second part of his speech, when he uses one gesture to indicate the exact point through which the bullet has passed. Figure 1 shows the multimodal analysis of this passage, incorporating the still image in which the paramedic performs the gesture, which was described in the corresponding tier as "Tplj", i.e., "thumb pressing the lower jaw", and which also occurs when he utters the words *lower jaw* (see also that it is annotated in the transcription above within square brackets), thus performing an indexical function.
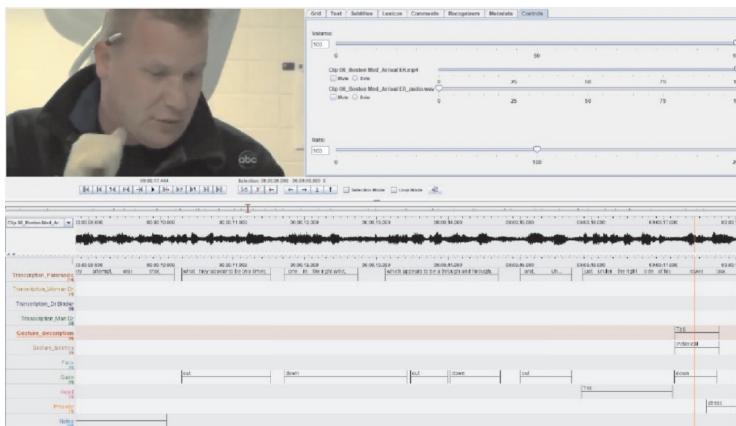

Figure 1. Multimodal analysis of a scene from the arrival at the ER sequence in Clip 1 (*BM*).

This is the only gesture that appears in this extract. This is due not only to the frequent change of camera angles, but also because doctors are working

on the patient and their hands are busy. One last interesting element refers to gaze, which is generally down for all speakers, as everybody is focusing on the patient. Only in the case of the paramedic does it often change from "down" to "out", so as to find an interlocutor for his description (cf. Figure 1 in the Gaze tier).

The very first part of clip 2 (00:04:19) from episode 1 of *Code Black* (also *CB*) shows a very similar situation, even though information is delivered by the paramedic while transporting the patient on the gurney into the ER. Therefore, even in this case gestures cannot be possibly used (see Figure 2).
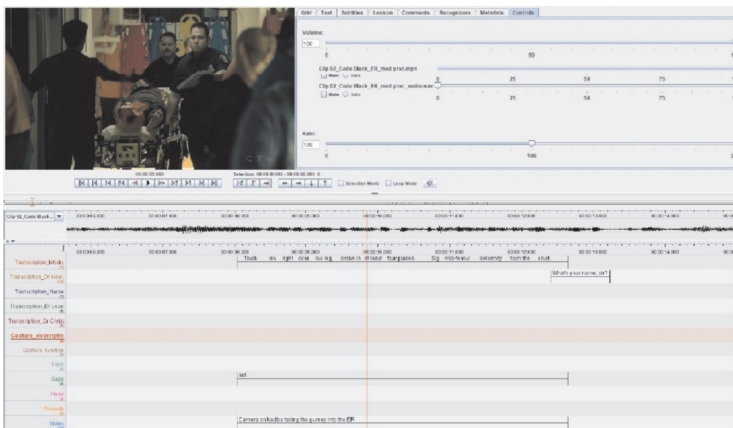

Figure 2. Multimodal analysis of a scene from the arrival at the ER sequence in Clip 2 (*CB*).

However, on the verbal level, the transcription of the scene of clip 2 below shows that the same linguistic features are employed in this particular situation, namely syntactic and morphological reduction. Moreover, it is worth pointing out the shift in register in Dr Hudson's turn 4, when first he answers his patient using a basic and easy terminology to explain to him what is going on, and then when he has to give instructions to a nurse to take action and assist him. In this latter case, he uses a directive in a reduced form, by simply listing the medicines the patient needs, using medical terms and the initialism *IV*, that is, "intravenous", and ending the speech act with the clipped form *stat*. *Stat* is a common medical abbreviation of the Latin word *statum*, for "urgent" or "rush", thus implying the need for a prompt action. This is part of the medical jargon and is a recurring expression as is the answer given by the nurse, namely *flying it*.

CODE BLACK: CLIP 2		
1	MEDIC	Ø Truck ran right over his leg, Ø broke in at least four places. Ø Big *mid-femur deformity* from the crush.
2	DR NEAL HUDSON to Wayne (patient)	What's your name, sir?
3	WAYNE	Wayne. I just can't feel my leg, doc.
4	DR NEAL HUDSON	Ø *Bone's* pinching a *nerve*. We're gonna help you.
	to nurse	*IV*, *fluids*, 20 milligrams *morphine stat*!
5	NURSE	Ø *Flying it!.*

3.2. Medical procedure in the ER

Clip 3 from *Code Black* is from episode 2 and it is approximately one minute long (00:01:04). It was selected because the scene is set in the ER, where the attending, Dr Leanne Rorish, is performing a medical procedure on a young boy with the help of a resident, Dr Christa Lorenson, a nurse, Jesse, and other medical staff. Following is the transcript of the entire clip.

CODE BLACK: CLIP 3		
1	DR RORISH	Okay, so, even in a *significant bleed, ABC* applies. **Airways always first**.
	to Dr Lorenson	Dr. Lorenson, <u>I want you to</u> *clamp open the nares* while Jesse *suctions* inside. **We need to find the source** of the *bleed*, okay? If we're lucky, it'll be *anterior and we'll be able to see it*. But if it's *posterior*, [which I fear it is], then/
2	JESSE	*Blood pressure's tanking!*
3	DR RORISH	Damn it. We need that *blood*. Unless we find a way to...
	to Dr Lorenson	<u>Get me</u> two *urinary catheters.*
4	DR LORENSON	*Urinary catheters?*
5	DR RORISH	Ø <u>Two *Foleys*. Now, please</u>.
	to medics and doctors	Okay, **we're gonna** *make a tamponade.*
	to Dr Lorenson	Dr. Lorenson?
6	DR LORENSON	Yeah.
7	DR RORISH	<u>Give me</u> that coffee over there.
8	JESSE to Dr Lorenson	Right there. Right there.
9	DR RORISH	**I need any liquid, and I need it now,** all right? **We just need it to inflate the balloon inside the nose.**
10	DR LORENSON	Sorry.
11	DR RORISH to Dr Lorenson	Ø **See how the balloon conforms to** the *cavity in the nose...*
12	DR LORENSON	Mm-hmm.
13	DR RORISH	**And Ø packs the *bleed*.**
14	NURSE	*Blood supply Ø coming up the ramp now!*
15	DR RORISH	Ø About time.
16	JESSE	Ø *Pressure's* stabilizing.
17	DR LORENSON	Got it. Got it.
18	DR RORISH	Okay? Ø A perfect *tamponade*. All right? It's gonna work. **Now we give him** more *PCC* and, uh, Ø **reverse the** *anti-coag*, and... and **we get him upstairs**.

The communicative exchange is led by the attending, Dr. Rorish, who is actually performing the medical procedure, while the other characters are simply assisting her. Generally, we can observe a high use of directives, on the one hand, and of explanations and descriptions, on the other: the first (underlined in the transcript) have an instructional function, as the attending needs to tell the staff what to do in order to help her, while the second (in bold) always follow the given orders. LA County hospital is also a teaching hospital, therefore the doctor has to explain what she is doing and why, so that the resident can understand and learn. This is also useful for viewers, as it is a way to popularise medical issues, but still using technical and highly specialised terms (in italics).

It is interesting to note how the pace of conversation changes from turn 1 to turn 3. At the beginning of the clip, we see Dr. Rorish operating on her patient quite calmly, as she has time to partially explain the meaning of the initialism *ABC* (i.e., "Airways, Breathing, Circulation", a common expression in the medical jargon) by stressing the importance of taking care of airways first in that situation, and then to give instructions to her staff by using a mitigated directive (i.e., with the construction *I want you to*) and to explain why by using complete sentences. While doing so, she uses the only gesture in the clip (i.e., "Palm up moving forward", with a modal function) along with the words *which I fear it is* and looking at her interlocutor, just for a brief moment. The reason for this low occurrence of gestures is that also in this case (cf. section 3.1.) hands are busy operating on the patient and cannot be used otherwise. At this point, the nurse, Jesse, warns everybody that something is not going well, thus the level of emergency dramatically increases. From this point on, brevity is the main feature: directives are expressed with straightforward commands, ranging from imperatives (*Get me two urinary catheters*, turn 3) to telegraphic orders with a noun phrase (*Two Foleys. Now, please*, in turn 5), lexico-morphological abbreviations with initialisms and clipping (*PCC* and *anti-coag*, respectively, in turn 18), and syntactic reduction with ellipsis (e.g. *Blood supply Ø coming up*, turn 14). Moreover, as previously stated, since gesturing is almost absent in this context, verbal cues can be integrated by other non-verbal cues, namely gaze and head movements. When Dr Rorish suddenly finds the solution to the problem in turn 7, she uses the directive *Give me that coffee over there*, which she utters while looking out at a cup on a shelf, and then she looks down again, in order to assist her patient (Figure 3).
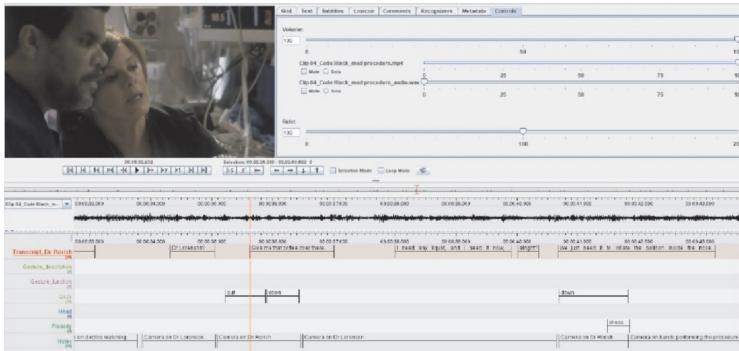
Figure 3. The use of gaze direction during a medical procedure in Clip 3 (*CB*).

The direction of her gaze here is pivotal, as she needs to indicate where the object is as fast as she can so that her resident, Dr Lorenson, can help her. The Notes tier in the screenshot in Figure 3 also shows how camera angles change fast and focus on the various characters and on their hands performing the medical procedure, in order to represent the frantic atmosphere of emergency and to show what is going on.

As pointed out above in this section, the hospital where *Code Black* is set is also a teaching hospital, therefore the last part of clip 4 (00:02:51) from episode 1 was analysed focusing on this aspect. The situation is one of emergency and Dr Rorish has just found the solution to effectively help her patient. However, since the medical procedure she wants to apply is quite risky and innovative, she asks her residents a series of direct questions in the style of a proper interrogation (cf. turns 3, 6, and 10 in clip 4, in bold), looking directly at her interlocutors. When the residents cannot give an answer, Dr Rorish's questions are generally followed by an explanation, as in turn 6 in the example below.

CODE BLACK: CLIP 4		
1	DR LEANNE RORISH	I need a *vas cath* in his *"L" subclavian* and all the *cold saline* that I can get.
2	DR NEAL HUDSON	<u>Leanne</u>? Ø A word?
3	DR LEANNE RORISH	**Who can tell me what I'm doing?**
4	NURSE (voice)	*Cold saline* Ø coming in!
5	DR MARIO SAVETTI	I'll get it.
6	DR LEANNE RORISH	Ø **Anyone?** I'm replacing all the patient's *blood* with *ice-cold saline*. **Why am I doing that?**
7	DR NEAL HUDSON	You shouldn't be Ø. He's already *decompensating*.
8	DR LEANNE RORISH	I need assistance, <u>Doctor Hudson</u>. I'll take it black with no sugar.
9	DR NEAL HUDSON	That's a man on that table, Leanne.
10	DR LEANNE RORISH to Dr Christa Lorenson [gesture]	**[You... are you ready] to speak yet?**
11	DR CHRISTA LORENSON [gestures]	**The *theory [of cold infusion]* is that it can create [a *temporary suspension of animation* through] *hypothermia*, buying the patient, in theory, the hour it'll take a *surgeon* [to repair the] *artery*.**
12	DR LEANNE RORISH to Dr Mario Savetti	Bingo! So you were right. We are going to kill him. We're going to kill him to save him.

Suddenly, Dr Rorish's didactic moment is interrupted by another attending, Dr Hudson, who addresses her using her first name *Leanne* (turn 2), thus reflecting a peer-to-peer relationship. The fact that she replies using the title *Doctor* in turn 8 can be explained by the fact that she is simply making a sarcastic comment, which is still in line with their familiarity. This is not what happens when, in turn 10, Dr Rorish asks her resident, Dr Lorenson, to give a reply to her question. The use of a blunt *you* accompanied by an indexical gesture and a direct gaze shows the difference of roles between the two characters (cf. "FP", as "forefinger pointing out", in the Gesture_description tier in Figure 4).
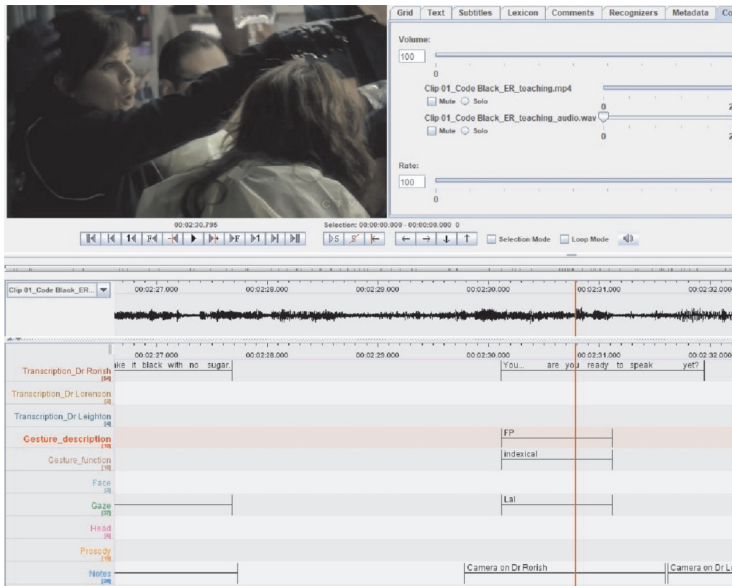
Figure 4. The multimodal analysis of an indexical gesture during a medical procedure in Clip 4 (*CB*).

Even though it has emerged that the number of gestures is quite low in this kind of interactions, they abound in Dr Lorenson's turn 11, when she has to describe a scientific theory to explain Dr Rorish's medical procedure. From the multimodal analysis of her speech in Figure 5 below, we can note that she uses three different gestures: the first two, i.e., "oHMu", that is, "open hand moving up", and "oHM1s", standing for "open hand moving to one side", are performed while looking directly at her interlocutor, and occur alongside key expressions, namely the name of the theory and what it consists in, to highlight their importance. Therefore, they perform a social function. Then, the camera angle changes to focus on Dr Rorish, whom we see proudly smiling around for the satisfactory answer, only to move back in a close-up of Dr Lorenson at the end of her speech, just in time to see one last gesture, namely "oHmF", "open hand moving forward" (cf. see the Notes tier in Figure 5). This last gesture, performed while looking out, has both a social and indexical function, since it occurs while she utters the words "to repair", which is the crucial aim of that precise medical procedure, and also indicates the patient on whom that kind of surgery has to be performed.
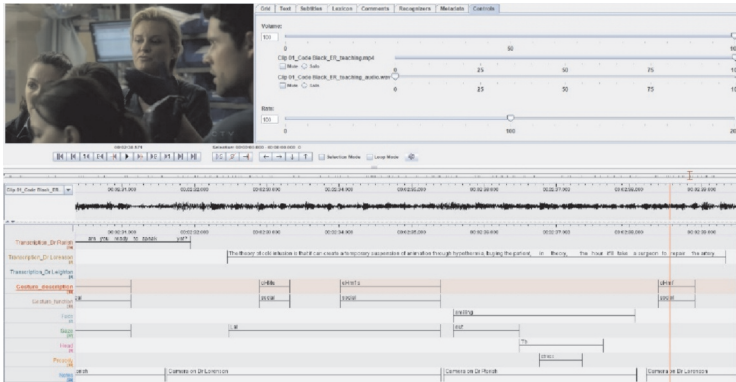
Figure 5. The use of gestures to explain a medical procedure in Clip 4 (*CB*).

3.3. Medical procedure in the OR

Performing a medical procedure in the OR rather than in the ER is quite different. This mainly relates to the level of emergency. If in the ER doctors have to be quick in making decisions and in taking action, in the OR the atmosphere is more relaxed, even though unexpected events may happen as well. The following two clips show two different ways in which surgery can be performed in the OR.

Clip 5 is from episode 2 of *Code Black* and lasts 01:23". The attending, Dr Hudson, is operating on his patient using a camera. Dr Lorenson, a resident, is assisting him. What is interesting in this clip is that the screen, where every step of the surgical procedure can be followed, plays a crucial role here. From a linguistic point of view, the conversational exchange is characterised by a series of descriptions of the various stages of the medical procedure Dr Hudson is carrying out (cf. in bold in turns 1 and 3 in the transcript of clip 5 below), followed by explanatory sequences, to the benefit of Dr Lorenson, who is in the OR also to learn. In this sense, clarification is attained, for example, through the simile *just like a kinked garden hose* in turn 1, but also by making continuous reference to what is displayed on the screen (cf. turns 1 and 3, within square brackets).

CODE BLACK: CLIP 5		
1	DR NEAL HUDSON [images on screen]	**We're in the *tube* now.** [Ø See that blue colour? That's the *tube* not getting enough *blood*.] Ø Just like a kinked garden hose. So let's find the spot where it's kinked.
2	DR CHRISTA LORENSON	*There!*
3	DR NEAL HUDSON [images on screen] (head)	That's it. **Now, with this hand, I'm gonna move the probe up to *the tip of the ovary* and Ø just flip it over.** Now watch. [The *blood should flow into the ovary*, and the colour will change. Any second.] There you go. Ø You want to drive? Come here. <u>Take the *wand*</u>. And the camera. Gently. Now you're slowly gonna back the camera out. Okay. [And watch the image.]
4	DR CHRISTA LORENSON	Why did you ever leave *surgery?*
5	DR NEAL HUDSON	Ah, long story. Okay, now you're gonna pull it all the way out through the *port*. Ø Gentle. Now just ease the *sleeve* out.
Monitor beeping rapidly		
6	DR CHRISTA LORENSON	What's happening?
7	DR NEAL HUDSON	Step out.
8	DR CHRISTA LORENSON	Did I do that?
9	DR NEAL HUDSON (gesture) to nurse (gaze)	No. I must've nicked a *vessel* when I put the *sleeve* in. The *sleeve* kept the pressure on. Uh, <u>we're gonna have to open her up</u>. <u>Can we have a *surgical tray*</u>, please?

Certainly, in this clip the camera often moves from Dr Hudson to the whole medical staff and to the screen, so that sometimes we can just hear the doctor's voice while watching the image directly on the video, as shown in Figure 6 below.
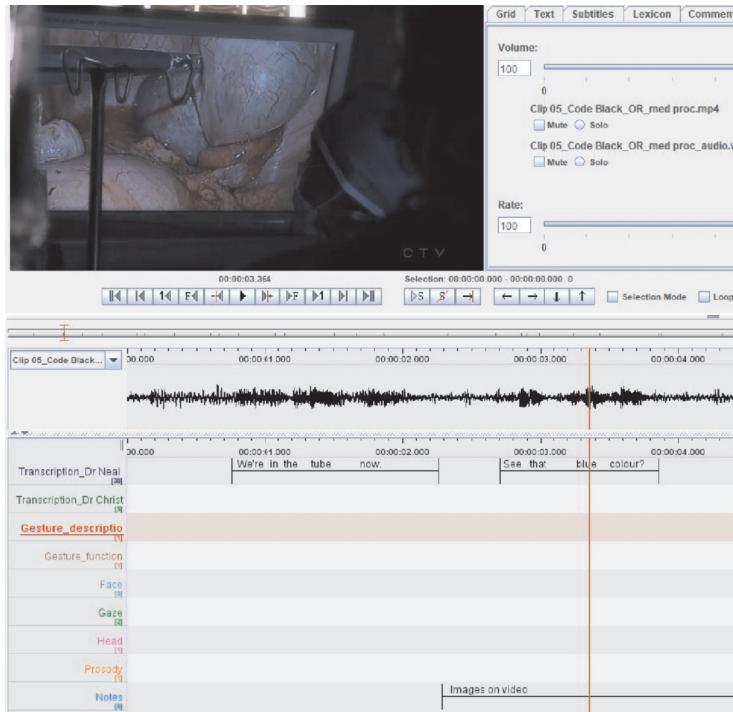
Figure 6. Medical procedure performed with a camera in Clip 5 (*CB*).

Another characterising feature of this sequence is Dr Hudson's use of directives, either in the form of imperative constructions (turn 3) or with *be going to* (turn 5), in order to give instructions to Dr Lorenson on what to do, especially when she is the one to take the lead after that Dr Hudson invited her to take the wound in turn 3. Such an invitation is accompanied by a quick head movement forward directed to the wand. Again the most frequent nonverbal cues are gaze direction and head movements, while only one gesture (i.e., "Palm up moving back and forth") is used at the very end of the clip, when something happens and Dr Hudson has to ask for help, thus expressing a performative function.

In clip 6 from episode 1 of *Boston Med* (00:01:02), Dr Maria Troulis, an oral maxillofacial surgeon, is operating on a patient assisted by other doctors. The atmosphere is quite calm, as can be inferred from the comments she makes at the very beginning of the scene (cf. in bold in the transcription of clip 6 below):

BOSTON MED: CLIP 6

DR MARIA TROULIS to doctors	Could you imagine how that poor family felt when they got the call at, like, three in the morning? We're gonna work towards the bottom of the *incision* so that we're even farther away protecting our *nerve*. Stay low for me, so you see I keep stepping the *wound* down this way. The biggest risk is really the *nerve*. So if you push the one *segment*-- no, no, no, back! You're scaring me. Oh, don't do that. Never do that.

Then she starts giving instructions on the medical procedure, again, either using the *be going to* construction or imperatives, as in clip 5. In the same way, she also explains the motive of her decisions. Her speech is slow-paced and full of pauses, in order to be as clear as possible. Finally, the most prominent nonverbal cues relate to prosodic features, gaze direction and head movements. One example is shown in the multimodal analysis in Figure 7, where she speaks looking down, that is, focusing on the incision she is making, but then looking right at her interlocutor when she needs to stress a point and be clear on what he has to do.
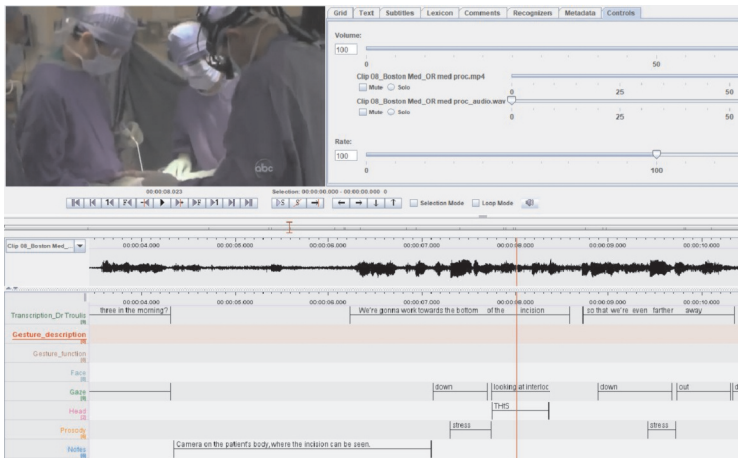
Figure 7. Use of gaze direction in Clip 6 (*BM*).

3.4. Discussion of the clinical case

The last situation under investigation is when doctors discuss a clinical case, either to understand what to do or to argue their point on how to handle it. The latter case is the one shown in clip 7, from episode 1 of *Boston Med* (00:01:02), where a resident, Dr Pina Patel, had some problems treating a patient and thus has to discuss the case with an attending, anaesthesiologist Dr Massimo Ferrigno. Following is the transcription of the dialogue:

BOSTON MED: CLIP 7		
1	DR MASSIMO FERRIGNO (voice) [gesture]	She started *seizing*, right? It looked like she was seizing. If you can't [*intubate* her, it's better to *ventilate*].
2	DR PINA PATEL [gesture]	[I-I never got the *tube* through].
3	DR MASSIMO FERRIGNO [gestures]	[We needed somebody with more expertise] in *airway*. And because of the delay she's going to suffer.
4	DR PINA PATEL	Okay, when I first got here, obviously, she's *obese*. And they were saying that she was difficult to ventilate. So, where's *anesthesia*?
5	DR MASSIMO FERRIGNO	So you don't get *attending coverage*?
6	DR PINA PATEL [gesture]	[We don't get attending coverage], no.
7	DR MASSIMO FERRIGNO	That's a major, major problem. It's really not acceptable.
8	DR PINA PATEL [gestures]	I [understand], but [I had asked for] anesthesia the minute I got here..
9	DR MASSIMO FERRIGNO	Sorry, I need to know who is your *attending* and I need to talk to him.
10	DR PINA PATEL	I understand.
11	DR MASSIMO FERRIGNO	This is a difficult situation. I'm not saying it's your fault or anything, but, you know, the *patient*'s life is being affected.
12	DR PINA PATEL	No, I understand.

The camera moves from the medical staff assisting the patient to the two doctors arguing about what has just happened, with long shots, then zooming on them from behind or in profile, as to give them space, since this is a real and not fictional event. Both doctors use a fair amount of gestures while talking, as the multimodal analysis of the first part of the dialogue in Figure 8 shows.

Figure 8. Multimodal analysis of gestures while discussing a clinical case in Clip 7 (*BM*).

In detail, they both look at one another while supporting their ideas. On the one hand, Dr Ferrigno mostly uses gestures such as "Psmd", standing for "Palms moving down", with a parsing function, in order to mark different words within a sentence, and also uses prosodic stress on keywords such as *expertise*. He is quite blunt and harsh in judging Dr Patel's behaviour towards the patient. On the other hand, Dr Patel desperately tries to explain what she did and why she did it using a wider repertoire of gestures performing different functions. For instance, as shown in the still image in Figure 8, when she utters the words *I-I never got the tube through*, she uses the performative gesture "RFb", that is, "rotating fist backwards", to help her interlocutor to visualise the action she should have taken.

The last clip selected for this study is clip 8 and it is from episode 2 of *Code Black* (00:01:35). Here the atmosphere is not as tense as in clip 7, since the attending doctor, Dr Hudson, and his resident, Dr Lorenson, are re-examining a patient in order to establish the cause of her pain. The patient witnesses the discussion and is often asked questions so that the doctors can help her. This factor highlights the difference between expert/non-expert and expert-to-expert interaction. See the transcription of the clip below:

CODE BLACK: CLIP 8		
1	LAURA HALLORAN in pain	I was on my way here.
2	DR CHRISTA LORENSON	You were on your way to the hospital?
3	LAURA HALLORAN	The pain was sudden, and... and so intense, I threw up..
4	DR CHRISTA LORENSON to Dr Hudson	*Ø Appendix?*
5	DR NEAL HUDSON to nurse	**No, I don't think so.** Risa, I need the *ultrasound*.
6	NURSE	Ø Flying in.
7	DR CHRISTA LORENSON to Dr Hudson	**Ø You think it's *internal bleeding*? *GP* won't show up on *ultrasound*.**
8	DR NEAL HUDSON	**Ø Very good. But no Ø. We're not looking for *blood*. I have a hunch. Oh, that's interesting.**
	to Laura Halloran	You... you don't have a *right ovary*.
9	LAURA HALLORAN	No, just... just a left. Why? Is something wrong with it?
10	DR NEAL HUDSON to Dr Lorenson [gesture]	**[Look. There should be a rainbow of flashing colours] here on the left, coursing through her *left ovary*. But there's nothing. It's just darkness.**
11	DR CHRISTA LORENSON	*Ø Torsion?*
12	DR NEAL HUDSON to Laura Halloran	<u>Laura</u>, your *ovary* is twisted, cutting off the *blood flow*. It's called a *torsion*.
13	LAURA HALLORAN	Is it dangerous?
14	DR NEAL HUDSON	I <u>need to know</u> when the pain started... Ø Exactly when.
15	LAURA HALLORAN	Um... I was... I was moving some... some boxes from my basement. It was around 9:00. I came straight from there.
16	DR NEAL HUDSON	An *ovary* has about six hours it can survive without *oxygen*. That means, if we're lucky, we have about three hours to *detorse* it, or...
17	LAURA HALLORAN	I'll lose it?
18	DR NEAL HUDSON	<u>I'm afraid so</u>, yeah.
19	DR CHRISTA LORENSON to Laura Halloran	<u>Can I ask you</u> what happened to your other ovary?

More specifically, the two doctors use syntactic and morphological reduction, namely elliptical questions (turns 4, 7 and 11), and initialisms (*GP*, turn 7), respectively, together with other specialised medical terms (in italics in the transcription). Such brevity in the way of speaking is made possible by shared knowledge and by the professional relationship between interlocutors. The same happens in the brief dialogue between Dr Hudson and a nurse, Risa, who is asked to bring the ultrasound through what seems a simple statement in turn 5. This is an implicit directive, which, with the use of the proper name in the vocative, may sound impolite and blunt. However, such an economic way of speaking simply reflects the routine in professional settings, where efficient and effective communication is required. The elliptical and informal answer given by the nurse in turn 6 confirms this idea. Conversely, the tone is completely different when the two doctors talk to their patient. The last part of the conversational exchange, from turn 12, consists of exhaustive and clear explanations of medical terms and procedures (turns 12 and 16) and of the use of mitigating strategies in order not to frighten the patient herself and to create empathy (cf. see underlined elements in the transcription), i.e., the use of the vocative with the first name in turn 12, the use of hedges, as in the response in turn 18, and finally, the use of indirect questions in turns 14 and 19.

Moving back to expert-to-expert interaction, as explained above, in the first part of the dialogue the two doctors brainstorm some ideas to identify the cause of their patient's pain. The conversation goes on with hypothesis formulation and explanations, while exchanging glances, until Dr Hudson has an idea and decides to use an ultrasound scanner. This is when he uses a gesture, namely "PoS", that is, "pointing out to the screen", to show his colleague what he thinks the problem is with their patient. As can be seen from the still image in Figure 9 and also from the multimodal analysis of this sequence, this gesture has an indexical function, and the doctor's gaze move from the screen to his colleague in order to catch her attention and to better support his idea.
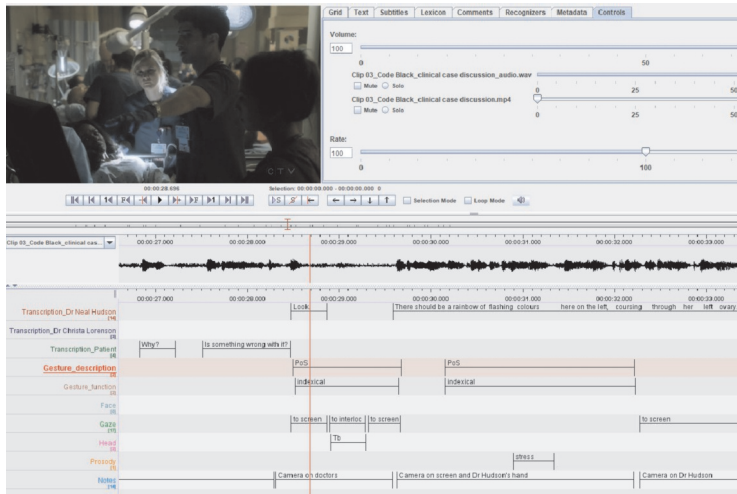
Figure 9. Multimodal analysis of gestures while discussing a clinical case in Clip 8 (*CB*).

4. Conclusions

The present paper is a qualitative study that aimed to give an overview of spoken interaction between professionals in different medical settings as portrayed in two TV programmes, namely a TV series and a documentary. The analysis was carried out multimodally, thus simultaneously taking into account both verbal and non-verbal cues. Based on the three main different contexts represented in the selected clips, it is possible to draw some preliminary conclusions about the most characteristic features displayed in each situation analysed.

Overall, the arrival at the ER is usually characterised by a series of descriptions delivered in a reduced form due to the high level of emergency, but which are made possible because of the knowledge shared between interlocutors. In this respect, the TV series *Code Black*, although fictional in nature, shows many similarities with respect to the documentary, *Boston Med*. The scenes portraying medical procedures are full of descriptions and explanations, but also directives, with an instructional function, and the way in which they are expressed differ according to the level of emergency of the situation, i.e., whether it takes place in the ER or in the OR. Moreover, from the analysis of non-verbal cues in the selected clips, it has emerged that gestures are not employed so frequently, and this can be explained by the fact

that in certain situations, such as when performing a medical procedure, hands are busy assisting the patient. Therefore, gaze direction and head movements become more prominent in these sequences and are used either as substitutes of gestures or to build rapport with a colleague. Gestures, on the other hand, appear to be used much more when doctors discuss a clinical case, either to formulate a diagnosis while visiting a patient or to argue about how a patient was assisted.

To conclude, it is fair to acknowledge that both TV products are able to provide a wide repertoire of contexts which portray interactional exchanges between medical professionals. A further step in this type of research could be to carry out both a qualitative and quantitative study by comparing the two genres at stake in order to ascertain the validity of the material as a suitable resource for the teaching of medical English.

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NOTES

[1] The present study is also part of a research project financed by the Italian Ministry for the University (PRIN 2015 no.2015TJ8ZAS).

[2] ELAN was developed at the Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands. It is freely available at http://tla.mpi.nl/tools/tla-tools/elan/

[3] The 5 five clips from *Code Black* are part of the ESP Video Clip Corpus, which is a multimodal corpus under construction within a research project developed at the University of Pisa. For further information on the show, visit the CBS website at https://www.cbs.com/shows/code-black/.

[4] For further information on *Boston Med*, visit https://web.archive.org/web/20100811003823/http://bostonmed.abcnews.go.com/.

[5] In hierarchy, the attending is above the resident, who is still in training.