Framing trauma leaders' request in emergency care interactions: a multimodal analysis using eye-tracking glasses

Abstract

A team leader's requesting is a crucial factor for successful team interaction to ensure patient safety in emergency care. This study examined how the team leaders accomplish and frame immediate requests through language use and corresponding eye-movement patterns in emergency care simulation. Two teams were recorded undertaking separate simulated operations on a stooge patient, each comprised of a team leader wearing eye-tracking glasses (one session with a senior doctor as a leader [SD] and the other with a junior doctor [JD]), two foundation doctors, who are in their first two years in medical practice, two emergency department (ED) nurses, and one ED expert. Analysis of video, audio and eye-movement data revealed that SD made immediate requests to their members with multimodal emphasis, i.e., gazed at the recipients and addressed them verbally, especially when asking for recipients' action, while, JD often used only gaze in requesting. Although our study has limitations in the small size of the data, the results nevertheless highlights that the leader's requesting was framed and ascribed in the continuum from a question to an instruction through co-construction of joint action with recipients in the social interaction.

Keywords: emergency care interaction, frame, requesting, multimodality, eye-tracking, healthcare simulation,

1. Introduction

People perform, perceive and interpret what they are doing in a social interaction, *framing* it in a given situation (Bateson 1972 [2000]; Goffman 1974). Medical encounters are one such situation. A team of healthcare professionals perform together in an operation theatre or an emergency care setting, framing their interactions. In the context, a team leader's requesting is

a crucial factor for successful team performance (Mondada, 2014). This study investigates embodiment of discourse frames, which involves interlocutors' linguistic forms and non-verbal behaviours, in trauma team leaders' making requests in emergency care simulation with eye tracking glasses, comparing the practices of a senior and a junior leader. Three research questions are addressed here: (1) how do the trauma leaders initiate requests in emergency care interaction in what syntactic forms, (2) what gaze and multimodal behaviours are observed in their requesting practice, and (3) are there any differences between a senior and a junior doctor? The current study employs both a quantitative multimodal corpus analysis, and qualitative discourse and interactional linguistic analytic approaches. The following sections first review existing studies of discourse frame and requesting before moving on to the analysis and discussion.

2. Literature Review

Discourse frames in healthcare communication have been investigated in primary consultations. Frankel (1983) visually analysed a sequential transition from the activity of a paediatricians' touch on a child patient in a medical examination to the physician talking and then to the patient's response, capturing gaze orientations of the physician. Heath (1986) observed doctor-patient interactions and recognised a "middle-distance orientation" of

patients' gaze to make their body as an object of a doctor's inspection. Tannen and Wallat (1983) identified different frames and participation structures in a paediatric examination, a social work session and a staff meeting. While, Candlin (2002) found that an experienced nurse framed a medical consultation with an elderly patient as a social interaction, expanding beyond ostensibly relevant topics to put the patient at ease.

As for Gaze in healthcare interactions, Deppermann (2013) described how paramedics used gaze in mutual monitoring between the team members while dealing with multiple tasks simultaneously. Another study from an operating theatre was reported in Mondada (2014), who analysed the sequence of a surgeon's verbal/non-verbal instructions and an assistant's responses to achieve *joint attention* (Tomasello 1999). How healthcare professionals as a team multimodally frame their interactions is central interest of this study, and the leader's requesting practice is a key for successful team performance.

Requesting has been investigated from different perspectives and the shift was observed in the discussion from cognitive nature of request as a *speech act* to interactional practice of request as *action formation* in interaction linguistics as reviewed in Drew and Couper- Kuhlen (2014). In linguistic philosophy, request as an act is directive and performative (Austin 1962; Searle 1969), which requires felicity conditions to be fulfilled. While in politeness theory, request is potentially face threatening to the recipient (Brown

and Levinson 1987). Focusing on linguistic forms, Blum-Kulka, House and Kasper (1989), compared pragmatic strategies of requests across cultures, establishing a classification of indirect strategies, e.g., *ability* (Can you do X?), *willingness* (Do you mind doing X?), *prediction* (Will you do X?) and *suggestory* (Why don't you do X).

From an interactional linguistic view, Walker and Drew (2008) investigated the use of two syntactic forms of requests in medical calls in the UK, a interrogative form *Could you do X?* and a declarative form *I wonder if*, concluding that with the latter, a speaker expresses their entitlement to request.

The continuum between requesting and related acts was also explored. Candlin and Lucas (1986: 22–23), for example, looked at the act of advising and proposed the model of the advising continuum from "educating" to "directing" in counsellor-client interactions (also see Sarangi 2000). To develop the theoretical argument to define directive and commissive actions, Couper-Kuhlen (2014) examined the forms of these acts in dyad casual conversations, describing differences between the agent and beneficiary of the act. The epistemic stance of a speaker and a recipient also involve how the speaker performs acts of requesting and asserting (Heritage 2012). Both acts can be expressed in the same syntactic forms of declarative or interrogative, but a declarative of the matter in a speaker's epistemic

domain (K+) is assertion, while that in a recipient epistemic domain (K-) is a declarative question (requesting information).

Levinson (2013) then introduces the concept of "action ascription", which means "a course of action that at least one participant is pursuing, which may at first be opaque to others then retrospectively discernible" (p.122). When requesting, a speaker has a plan of what, when, how and to whom he will request, which is projected in their utterances although the plan may not always be explicit or observable to others when it is uttered. This again touches upon the incompleteness of actions and how a speaker and a recipient collaboratively frame the potentially ambiguous activities. Both syntactic forms and frames of requests are examined in the current study from an interactional linguistic perspective, applying multimodal corpus analysis.

Corpus linguistics has been in a transition from monomodal to multimodal in these two decades, addressing multiple semiotic resources in interactions from verbal utterances to gestures, posture and gaze (Adolphs and Carter 2013; Allwood et al. 2000; Baldry and Thibault 2006; Knight 2011; Tsuchiya 2013). Adolphs, Knight and Carter (2011), for instance, captured subject's views and activities through a head-mounted camera. Auer (2017) captured eye gaze in a multi-party interaction with eye-tracking glasses for the analysis of turn-taking mechanisms. The current research positions itself in both areas of multimodal corpus analysis,

using eye-tracking glasses to capture the trauma leaders' eye gaze, and in interactional linguistics, which derives from multiple disciplines, e.g., discourse functional linguistics and conversation analysis (Couper-Kuhlen and Selting 2018). This mixed method allows researchers to gain both a global pattern in the use of linguistic forms and a detailed description of embodiment of the leaders' requesting practice in interactions.

3. Data and Methodology

Two recordings of emergency care simulation with the same trauma scenario were analysed. The recording took place at the Queen's Medical Centre Nottingham, UK, as part of regular simulation training (see Appendix 1 for the setting). Two teams were recorded undertaking separate simulated operations with a stooge patient. Each comprised of a team leader wearing eye-tracking glasses (the first session with a senior doctor as a leader [SD] and the second with a junior doctor [JD]), two foundation doctors (FD1 and FD2), two emergency department (ED) nurses (a senior nurse [SN] and junior nurse [JN]), and one ED assistant (EDA). The same team members participated in both sessions with a different team leader. Several recording devices were set up in the room: three video cameras and a pair of eye-tracking glasses, SMI ETG2, which is a binocular eye tracking using the corneal reflex.).

The eye-tracking data was first transferred to an application software iMotions, and

then extracted as texts and a video streaming to import to an annotation tool ELAN (2001−2015). Each session lasted about 19 minutes in total. In both sessions, the scenario was a trauma case with a simulated patient (60 years old, male), on whom a wardrobe fell. After a patient came in, a paramedic did a handover to the leader as the primary recipient, one of FDs conducted a primary survey as assigned by the leader in advance, then a patient was given TXA (tranexamic acid), which prevents haemorrhage. Blood was taken for a blood gas test, and a blood transfusion was given. The team put a dressing on a wound on the patient's wrist and a pelvis bandage on his waist, then prepared for a trauma scan.

The recordings were transcribed and time stamped. Syntactic forms in the two leaders' requests were first coded in a spreadsheet and compared quantitatively, and then, seven episodes from their activities of making requests with the use of gaze were qualitatively described.. Snapshots of the leaders' utterances and eye gaze were also provided in the qualitative analysis, in reference to illustrations in Mondada (2014). For the quantitative analyses, Chi-Squared tests of association were conducted to determine if the type of request behaviour that was observed was associated with the experience of the Doctor (Junior or Senior). Inferences of association between the request behaviour and the doctor experience were made by inspection of the Pearson Residuals where the more positive values suggest a stronger association between variables and negative values suggest weaker or no association

between variables. This research project was approved by the ethics committee of Nottingham University, and informed consent was obtained from all the participants involved.

5. Data Analysis

5.1 Quantitative analysis

Table 1 shows the lengths of the operation time of the simulation and leaders' speaking time, which are similar in the two sessions: the operation time is about 18 mins 40 secs in both, and SD spoke about 9 mins in total and JD about 9 mins 40 secs.

Table 1 Speaking time lengths and numbers of requesting

	Operation Time (MM:SS)	Speaking Time (MM:SS)	Word Count	No of Immediate Request				
				Self-initiated	%	Other-initiated	%	Total
SD	18:44	9:01	1888	48	84.2%	9	15.8%	57
JD	18:40	9:38	2090	49	68.1%	23	31.9%	72

During the simulation, SD made requests 57 times in total, about 84% of which were self-initiated. The number of occurrences of making requests by the JD was 72, about 32% of which were initiated by others. That is as twice as that in SD, indicating that JD was more frequently prompted by a member of the team to make requests. Occurrences of the leaders' making requests in the third position were also included in the latter category, e.g., the

leaders' requesting by uttering, "yes, please", to respond a suggestion made by a member.

A (2x2) Chi-squared test of association was conducted to determine if the request type (Self-initiated, Other-initiated) was associated with the experience of the Doctor (Junior, Senior). The test revealed that the request type was significantly associated with the Doctor experience (χ^2 (1) = 4.45, p = 0.035). From inspection of the Pearson Residuals (brackets) we can infer that there was a stronger association between a Senior Doctor making a Self-initiated request (0.79) than a Junior Doctor (-0.70). There was a stronger association between a Junior Doctor making an Other-initiated request (1.22) than a Senior Doctor making an Other-initiated request (-1.37).

Through the observation of the data, two types of immediate requests in the leaders were recognized: seeking action (recipient takes action in response) and seeking information (recipient provides information in response). Some requests were accompanied with gazing at a recipient and the use of address terms. The co-occurrences of leaders' gaze and address terms in the leaders' requesting are summarised in Table 2.

Table 2 The co-occurrence of gaze and address terms in the leaders' requesting

	SD						JD					
	No of Request						No of Request					
	Action	%	Info	%	Total	%	Action	%	Info	%	Total	%
Only with gaze	8	27.6	12	42.9	20	35.1	21	65.6	23	57.5	44	61.1
Only with address	1	3.5	2	7.1	3	5.3	0	0.0	0	0.0	0	0.0

With gaze and address	19	65.5	10	35.7	29	50.9	6	18.8	6	15.0	12	16.7
Without gaze and address	1	3.4	4	14.3	5	8.8	5	15.6	11	27.5	16	22.2
Total	29		28		57		32		40		72	

Note. The total percentage of SD's requests did not add up to 100% due to rounding.

Both in SD and JD, half of the instances of immediate request was used for seeking action and the other half for seeking information. *When SD made requests, he often gazed and called their names* (50.9%), especially when *directing the recipients' action* (65.5%). While, *in JD, he tended to use gaze at recipients without address terms* when requesting (59.7%). The co-occurrence of address terms and gazing in requesting in JD (15.3%) was limited compared with SD (50.9%).

A (2x4) Chi-squared test of association was conducted to determine if the type of Gaze-address co-occurrent request (Gaze Only, Address Only, Gaze & Address, No Gaze & No Address) was associated with the experience of the Doctor (Junior, Senior). The test revealed that request type was significantly associated with the Doctor experience (χ^2 (3) = 23.38, $p < 0.001$). From inspection of the Pearson Residuals (brackets), we can infer that there was an observed association between a Junior Doctor making a Gaze Only request (1.39) that was not observed with a Senior Doctor (-1.56). There was an observed association between a Senior Doctor making a Gaze & Address type request (2.56) not observed with the Junior Doctor (-2.28). There was an association between a Junior Doctor making a No Gaze & No

Address request (1.25) that was not observed in the Senior Doctor (-1.40). Whilst one could infer an observed association between a Senior Doctor and an Address only request (1.45) compared to a Junior Doctor (-1.29), this is unlikely to be meaningful given the total number of this type of request (3). These data can be viewed in Figure 1 as proportion of total requests.

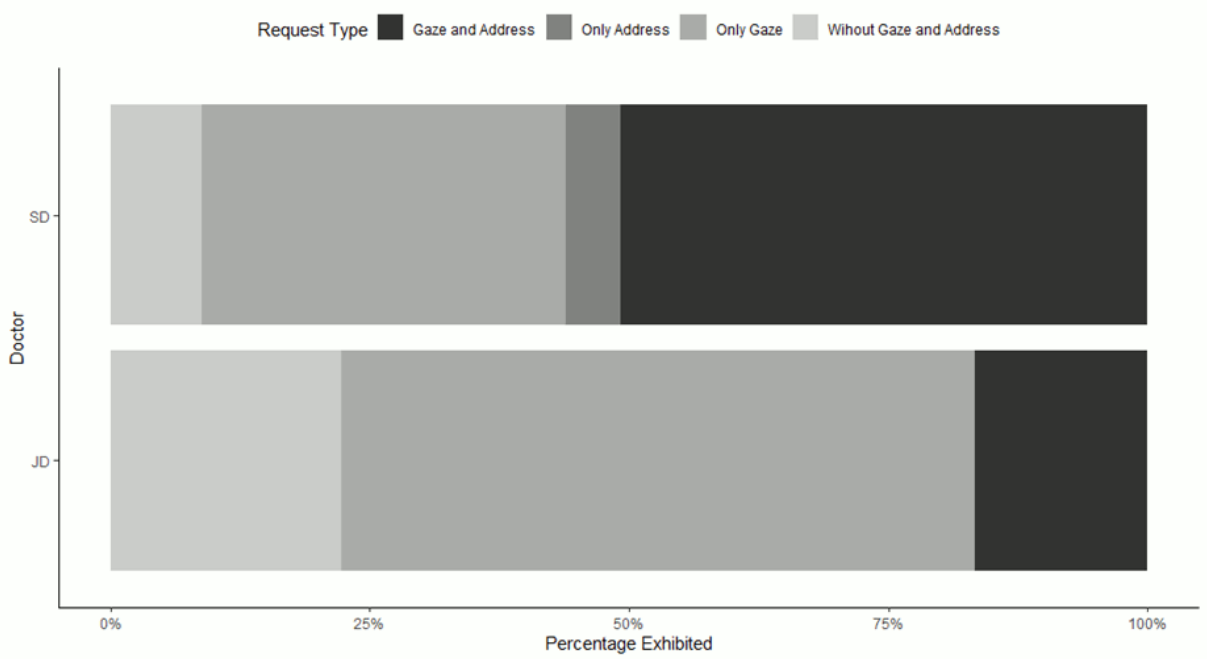

Figure 1. Proportion of the request behaviours exhibited by the Senior Doctor (SD) and Junior Doctor (JD)

Because of its comprehensive system, the classification in Blum-Kulka (1989) was adapted to the analysis. Syntactic forms of the trauma leaders' making requests were

categorized into direct and indirect requests, and the latter has six sub-categories: ability (Can you/we do X?), willingness (Do you mind/are you okay with doing X), predictory (Will you do X?), suggestory (How about/I suggest X), necessity (I/We need X) and knowledge (Do you/we know X?), adding the latter two for this analysis. Table 3 shows the number and percentage of each syntactic form in SD and JD.

Table 3 Linguistic forms in the leaders' requests

		Direct Request		Indirect Request														Total
			%	Ability	%	Willingness	%	Prediction	%	Suggestory	%	Necessity	%	Knowledge	%	UC	%	
SD	Action		NA	16	44.4	11	30.6	4	11.1	3	8.3	1	2.8		NA	1	2.8	36
	Info		NA		NA		NA		NA		NA		NA	28	100		NA	28
	Total	0	NA	16	25.0	11	17.2	4	6.3	3	4.7	1	1.6	28	43.8	1	1.6	64
JD	Action	4	9.5	19	45.2	2	4.8		NA		NA	7	16.7	5	11.9	5	11.9	42
	Info	2	4.9		NA		NA		NA		NA	1	2.4	38	92.7		NA	41
	Total	6	7.2	19	22.9	2	2.4		NA		NA	8	9.6	43	51.8	5	6.0	83
Total		6	4.1	35	23.8	13	8.8	4	2.7	3	2.0	9	6.1	71	48.3	6	4.1	147

Note. UC means unclassified.

Table 4 Linguistic forms and agents in the leaders' requests

		Direct Request	Indirect Request																Total
			Ability			Willingness	Prediction			Suggestory		Necessity		Knowledge of				UC	
		You	I	You	We	You	We	You	S/He	I	We	I	We	us	you	patient	others		
SD	Action		4	10	2	11	1	2	1	1	2		1					1	36
	Info													12	1	9	6		28
	Total		4	10		11	1	2	1	1	2		1	12	1	9	6	1	64
JD	Action	4	1	11	7	2						1	6	1	2		2	5	42
	Info	2										1		15	5	9	9		41
	Total	6	1	11	7	2						2	6	16	7	9	11	5	83
Total		6	5	21	9	13	1	2	1	1	2	2	7	28	8	18	17	6	147

Note. UC means unclassified.

The leaders sometimes used two or three forms to make a request, so the total number of their requesting forms (SD=64, JD=83) in Tables 3 and 4 is larger than those (SD=57, JD=72) in Table 2. Their requests in the third position were categorized as unclassified (UC) in Tables 3 and 4. There are few instances of direct requests only in JD (4.1%), but most of the leaders' requesting were realized indirectly. More than 40% of the leaders' requesting was realized in forms of questions to seek for knowledge (43.8% in SD and 51.8% in JD). Apart from them, request strategies concerning recipients' (or their own) ability (25.0% in SD and 23.2% in JD) are the ones both leaders used most to request recipients' action. SD also made requests with consideration of recipients' willingness (17.2%), with prediction of recipients' action (6.3%) and suggestory forms (4.7%). In JD's requests, there was only one instance categorized in willingness and no occurrence in predictory and suggestory. Instead, JD tended to express his or "our" necessity when requesting (9.6%) more frequently.

Breakdowns of the figures in Table 3 were shown in Table 4 with agents of actions and objects of knowledge the leaders requested. In requesting strategies concerning abilities, both SD and JD used the expressions concerning abilities (Can you do X? or Can I do X?), but the form "we" as an agent (Can we do X?) was observed only in JD's requesting. JD also

made requests by claiming “our” necessities (We need to do X) in some cases (6 times in JD and only one in SD). In terms of seeking for information, both leaders requested recipients to inform their knowledge about the progress of medical treatments (knowledge of us, e.g., *Did we get a venous blood gas?* or knowledge of you, e.g., *Have you taken the blood off?*) and health conditions of the patient (knowledge of patient, e.g., [*Does the patient have] any allergy at all?*). In JD’s requesting behaviours, these utterances in the form of information seeking in fact led to requesting recipients’ immediate action (5 instances, 12.2%). The leaders also asked about procedures and details of medical treatments (knowledge of others, e.g., *How does it [the order of a blood unit] work?*). Descriptions of the leaders’ requesting with his gaze behaviours are provided for the qualitative analysis in the next section.

5.2 Qualitative analysis

Through the quantitative analysis, seven episodes are focused to describe the multimodal embodiment of the leaders’ requesting practice.

Episode 1 SD’s concerning the recipient’s willingness

Episode 2 SD’s concerning “my” ability

Episode 3 SD’s predicting “her” (*other*’s) action

Episode 4 JD's expressing "our" necessity

Episode 5 JD's seeking action by questioning

Episode 6 JD's information seeking about "ourselves"

Extract 7 SD's information seeking without gaze at a recipient

Episode 1 includes an instance of SD's requesting action with concerning the recipient's willingness (see Extract 1 and Figure 2). Annotation conventions in multimodal corpus analysis are applied to the transcriptions (see Appendix 2). The extract starts just after the handover by a paramedic to SD. SD looked at the paramedic (Figure 2-1) and moved his gaze towards FD 1 (Figure 2-2), who was standing close to the patient with gaze at SD, being ready to start a primary survey as planned in the pre-briefing. FD1 looked down at the patient once he heard SD thanking to the paramedic, signalling a closure of the conversation. Then SD made a request concerning FD1's willingness in line 15, uttering "You're okay to crack on that <$E> Name of FD1 </$E>?".

Extract 1 Concerning the recipient's willingness in SD's requesting

1	01:41.5	<$F> SD looks at the
2		Paramedics in Figure 2-1</$F>

3	01:41.8	SD	Okay.
4	01:42.2	SD	Thank you very much for
5			that.
6	01:42.4		<$F> SD looks at FD2 </$F>
7	01:42.6		<$F> SD looks at FD1 in
8			Figure 2-2</$F>
9	01:42.8		<$F> FD1 looks back to SD
10			in Figure 2-2 </$F>
11	01:42.8		<$F> SD looks at FD1 </$F>
12	01:43.4	SD	Cheers.
13	01:43.8		<$F> FD1 looks at
14			the Patient </$F>
15	01:43.9	SD →	You're okay to crack on
16			that <$E> Name of FD1 </$E>?
17	01:44.1		<$E> FD1 shows thumbs-up
18			gesture in Figure 2-3 </$F>
19	01:44.3		<$F> SD looks at
20			the Patient </$F>

21 01:44.5 <$F> SD looks at FD1 in

22 Figure 2-4 </$F>

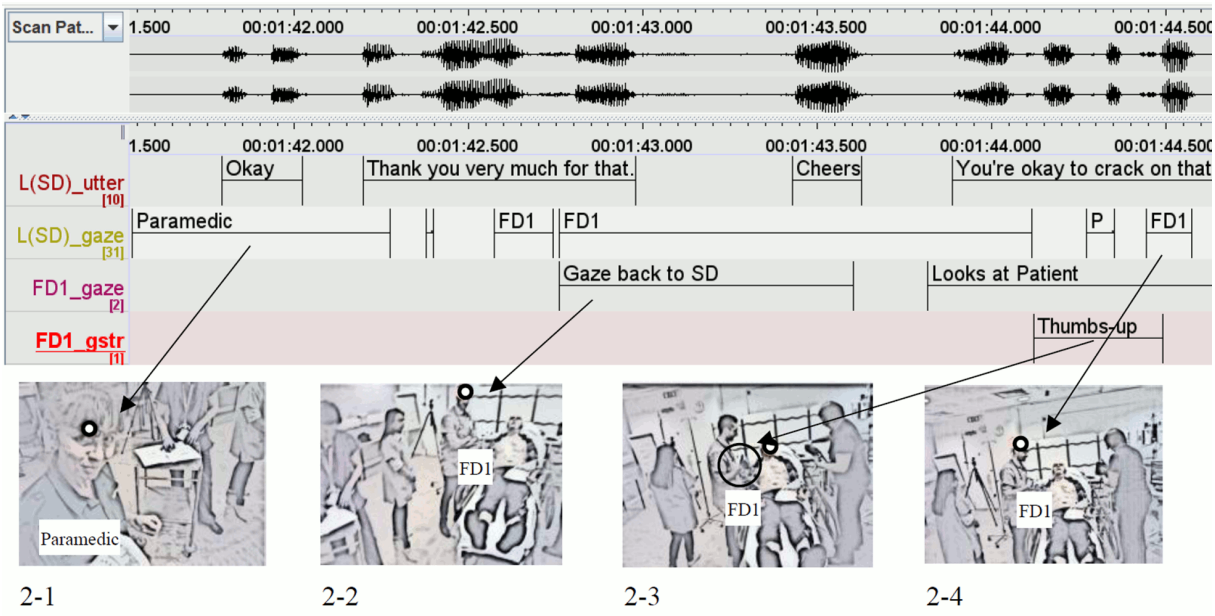

Figure 2: SD's concerning the recipient's willingness in Extract 1

To respond SD's request, FD1 kept his posture towards the patient for the primary survey, simultaneously showing his thumbs-up to SD without any verbal response (Figure 2-3). SD looked at the patient and gazed at FD1 again, who was interviewing the patient (Figure 2-4). In Episode 1, the SD's request was expected by FD1 as seen in FD1's preceding gaze (Figure 2-2), signalling his FD1's readiness for action, which was verbally confirmed by SD. We shall call this "anticipation gaze" by a recipient.

Episode 2 (Extract 2 and Figure 3) is continuation of Episode 1, where SD made a

request to SN with a request strategy concerning his own ability.

Extract 2 Concerning “my” ability in SD’s requesting

1	01:45.4		<$F> SD looks at SN in
2			Figure 3-1 </$F>
3	01:46.7		<$F> SD looks at SN </$F>
4	01:47.1		<$F> SD looks at Memo in
5			Figure 3-2 </$F>
6	01:49.6		<$F> SD looks at SN in
7			Figure 3-3 </$F>
8	01:50.3	SD	<$E> Name of SN </$E>
9	01:50.7		<$F> SD looks at the
10			Patient </$F>
11	01:50.8	SN	yeah
12	01:51.1		<$F> SD looks at JN </$F>
13	01:51.1		<$F> SD looks at the monitor
14			in Figure 3-4 </$F>
15	01:51.5		<$F> SD looks at the drip

16 line </$F>

17 01:51.8 SD → Could I get you to get a

18 gram of TXA please for this

19 chap if that's okay?

20 01:52.2 <$F> SD looks at the

21 patient </$F>

22 01:52.7 <$F> SD looks at the

23 monitor </$F>

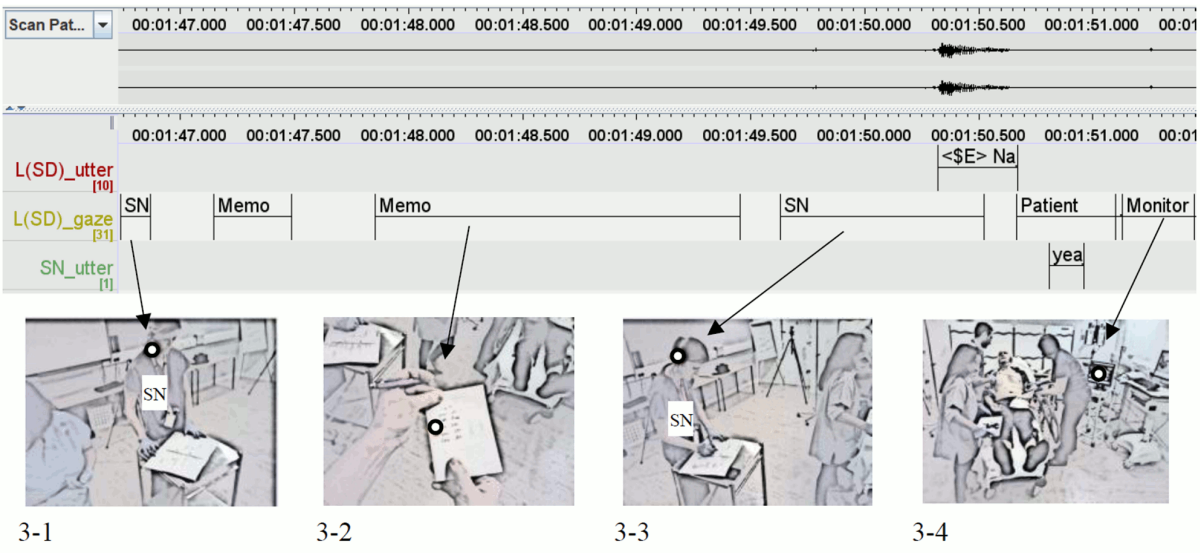

Figure 3: SD's concerning "my" ability in Extract 2

After SD asked FD1 to do a primary survey, SD looked at SN (Figure 3-1), who was scribing

a trauma book (operation records), and checked her name on the notes he took during the pre-briefing (Figure 3-2). Then, SD looked at SN again (Figure 3-3), calling her name at 01:50.3 to draw her attention, which was followed by SN's verbal response in line 8. SD quickly moved his gaze towards the monitor (Figure 3-4) and the drip line behind, and then asked SN to bring TXA in line 17. SN is then walking towards the cabinet to get the medicine. With the eye tracking data, his action projection of requesting became observable, i.e., SD's recipient selection for a request in due. To accomplish the act of request with SN, SD accumulated multiple modes, gaze, address terms and utterances with mitigation, i.e., a request strategy concerning his own ability and the recipient willingness (*if that's okay*) in Episode 2.

Before Episode 3 (Extract 3 and Figure 4), SD asked EDA to bring blood packs from a refrigerator. EDA came back with the blood and showed them to SD (Figure 4-1).

Extract 3 Predicting "her" (*other*'s) action in SD's requesting

1	06:55.3		<$F> SD looks at Blood in
2			Figure 4-1 </$F>
3	06:56.3	SD	That's fine. So, you can
4			hang up the unit, please.
5	06:56.9		<$F> SD looks at JN in

6			Figure 4-2 </$F>
7	06:57.2		<$F> SD looks at the patient
8			in Figure 4-3 </$F>
9	06:59.6		<$F> SD looks at FD1 </$F>
10	06:59.6	SD →	That's fine. <$E> Name
11			of JN </$E> gonna help you
12			with that.
13	06:59.9		<$F> SD looks at EDA in
13			Figure 4-4 </$F>
14	07:00.1		<$F> SD looks at the
15			patient </$F>
16	07:00.4		<$F> SD looks at the
17			blood </$F>

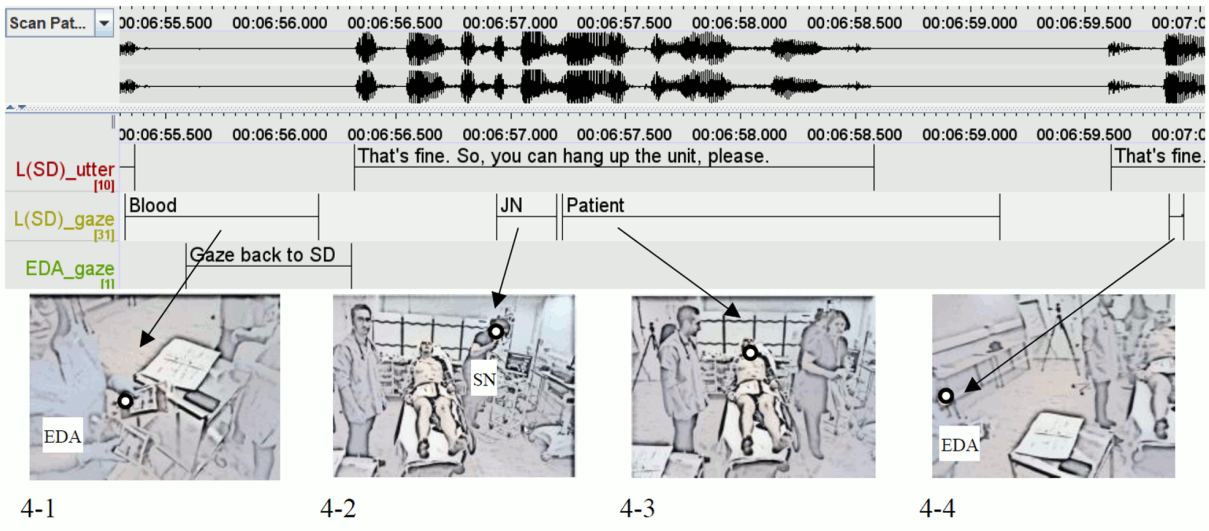

Figure 4: SD's predicting "her" (other's) action in Extract 3

SD looked at the blood and asked EDA to hang them up on the unit at line 3, and then looked around at JN near the unit (Figure 4-2), the patient in the middle (Figure 4-3) and FD1 in the other side of the patient. Being aware of the EDA still standing by him (Figure 4-4), SD repeated the request with a predictory form, uttering "That's fine. <$E> Name of JN </$E> gonna help you with that" in line 10, making requests to the two recipients: asking EDA to bring the blood to JN, and JN to hang them up.

A similar sequential pattern was observed in JD's making requests. Episode 4 (Extract 4 and Figure 5) is the excerpt after the handover from a paramedic and the primary survey by FD2.

Extract 4 Expressing "our" necessity in JD's requesting

1	03:22.6		<$F> JD looks at the
2			monitor in Figure 5-1 </$F>
3	03:24.9		<$F> JD looks at SN in
4			Figure 5-2 </$F>
5	03:24.9		<$F> SN looks at JD in
6			Figure 5-3 </$F>
7	03:25.1		<$F> JD looks at
8			the booklet </$F>
9	03:25.5		<$F> JD looks at the
10			monitor in Figure 5-3 </$F>
11	03:25.6	JD →	Erm we need to get
12			some TXA.
13	03:26.8		<$F> JD looks at SN
14			in Figure 5-4 </$F>
15	03:27.5	SN	TXA yeah.
16	03:27.6		<$F> JD looks at the
17			monitor </$F>
18	03:28.0	JD	Thank you.

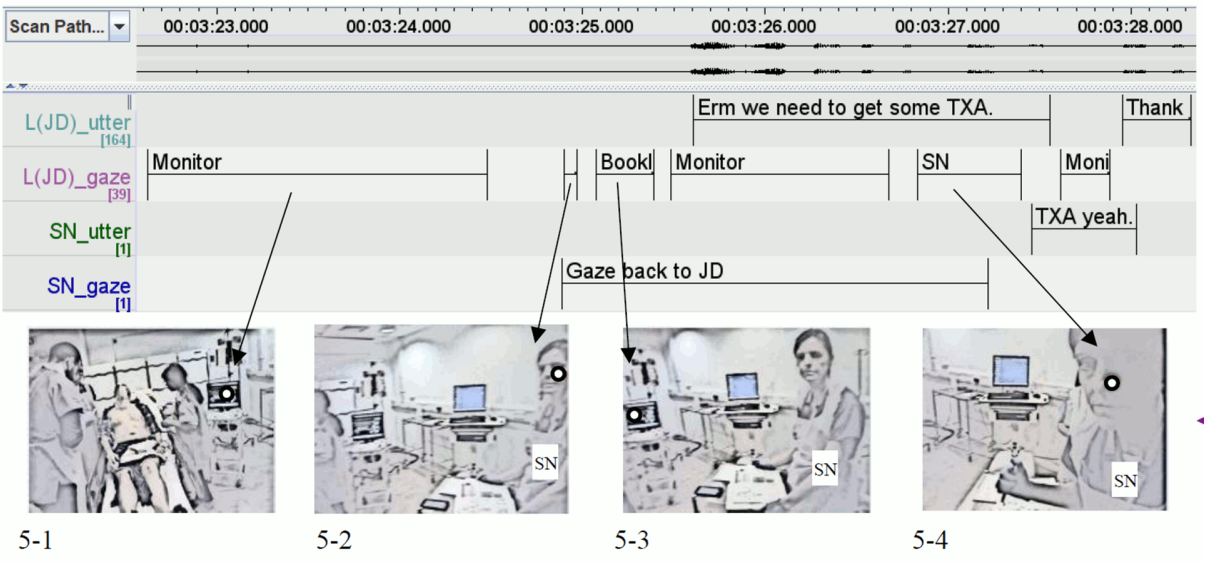

Figure 5: JD's expressing "our" necessity in Extract 4

JD looked at the monitor (Figure 5-1) and SN (Figure 5-2), who then looked back to JD (Figure 5-3). This is another case of anticipation gaze. Without any address term, JD asked SN to bring TXA, claiming the necessity of the medicine with "we" as an agent in line 11, gazing at her. SN came close to JD, responding, "TXA yeah", in line 15.

Soon after the requesting sequence in Episode 4, JD requested FD1's action by questioning, which is described in Episode 5 (Extract 5 and Figure 6). Before the extract, FD1 just finished placing an intravenous line, and he came towards JD and reported it in line 6 . JD saw FD1's approaching and shifted his gaze from the patient to FD1 in line 4(Figure 6-1).

Extract 5: Seeking action by questioning in JD's requesting

1	03:39.8			<$F> JD looks at the
2				patient </$F>
3	03:42.0			<$F> FD1 looks at JD </$F>
4	03:42.0			<$F> JD looks at FD1 in
5				Figure 6-1 </$F>
6	03:42.1	FD1		I get it <$E> an
7				intravenous line </$E>
8				<$H> on the right limb </$H>.
9	03:42.8			<$F> JD looks at the
10				patient in Figure 6-2 </$F>
11	03:43.3			<$F> JD looks at FD1
12				in Figure 6-3 <</$F>
13	03:43.4	JD	→	Thank you. Have you
14				taken the blood off?
15	03:44.8	FD1		Yeah.
16	03:45.2	JD		Yeah.
17	03:45.2			<$F> JD looks at the
18				patient </$F>

19	03:45.8		<$F> JD looks at FD1
20			in Figure 6-4 <</$F>
21	03:45.9	JD →	So full trauma blood
22			please if that's okay.

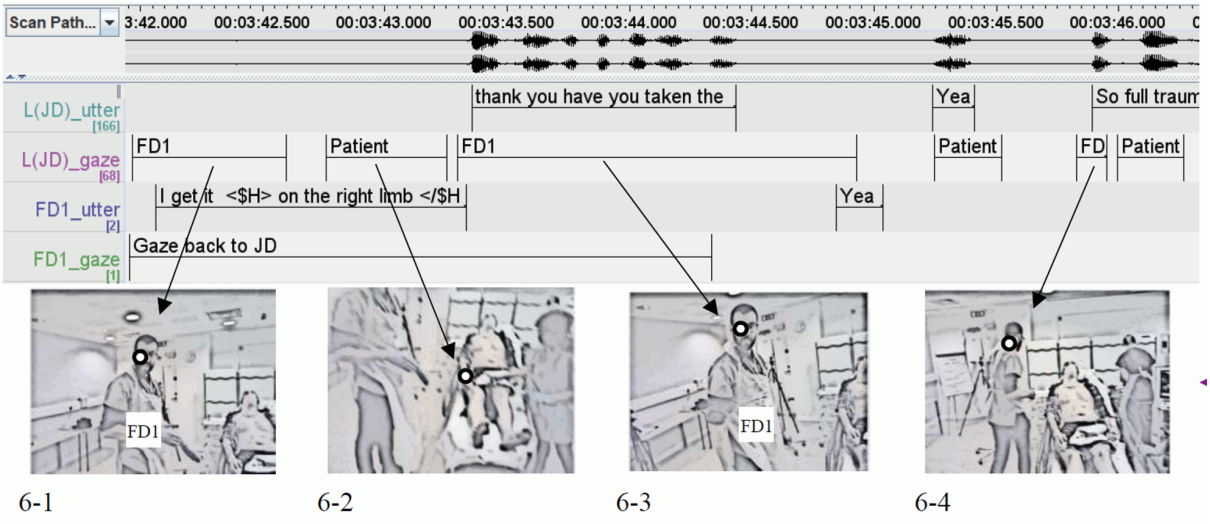

Figure 6: JD's seeking action by questioning in Extract 5

When JD heard the beginning of the FD1's reporting, JD shifted his gaze back to the patient's right arm, where the intravenous line was placed (Figure 6-2). JD then looked at FD1 in face again (Figure 5-3) and asked, "Have you taken the blood off?" in line 13, which is followed by FD1's verbal response and action to go back to the patient to take blood. Thus, this FD1's "Yeah" does not mean "Yes, I have", but "Yes, I will", which evidences the JD's questioning was recognized by FD1 as requesting both information and action. JD gazed at the patient and

FD1 (Figure 6-4), uttering “Yeah” to respond to FD1, and repeated the request, saying “So full trauma blood please if that's okay” in 21.

Another example of JD’s use of questioning in a request sequence is described in Episode 6 (see Extract 6 and Figure 7 in Appendix 3). This excerpt is about one minute after Episode 5. Here, JD’s making request concerning the recipient’s ability was preceded by his seeking information about the setting of the simulation with “we” as an agent. After summarising the treatments provided so far, JD looked at the monitor behind JN (Figure 7-1), then JN and the trauma booklet on the table (Figure 7-2). JD uttered “Erm” in line 6, showing hesitation, and asked, “Do= we don't have a major trauma team or do we?” in line 7and “Or do we” at in line 13, expressing his epistemic stance of not-knowing the procedure in the simulation without addressing a recipient. This action of JD’s requesting the information of the setting was marked by a silence pause followed. JD looked at JN, who silently gazed back to JD, then JD apologised for not knowing. This again was followed by a second-long pause.

JD then looked at the booklet in front of FD2 again, then FD2 uttered “Er”, showing hesitation. JD looked at JN, who took posture towards JD and FD 2, looking at FD2 (Figure 7-3). Still keeping his gaze on JN, JD started asking, “Can you activate major haemorrhage= er major trauma yet?” in line 24. Hearing just the beginning of this JD’s utterance, FD2

immediately responded verbally, “Yes yes”, overlapping with JD’s utterance and gazing back to JD (Figure 7-4). JD shifted his gaze to FD2 and then looked around the team while FD2 offered to give a call, saying “<$H> We'd better call? </$H>” in 38. JD accepted the suggestion and requested the action in the third turn in line 45.

The last episode is SD’s information seeking about the patient without gaze address at a recipient (Extract 7 and Figure 8 in Appendix 4). In the extract, FD2 was approaching SD with the result of the patient’s venous blood gas test, gazing at SD and uttering, “We've got the VBG result <$G?>.” in line 2.

SD looked at FD2 (Figure 8-1) and the document (the result) FD2 brought (Figure 8-3), responding by repeating, “VBG”, in line 8. Then SD shifted his gaze towards the patient and asked how many IV accesses they had placed in line 11, looking at the patient’s arms where the IV lines were inserted (Figures 8-3 and 8-4). He sustained his gaze at the patient while asking and also listening to FD2’s reply in line 26. This practice was observed in the cases of both leaders. The following section discusses the leaders’ multimodal behaviours in requesting further with the notions of framing, action ascription and epistemic stance.

6. Discussion

From the analysis, two different frames were identified in the leaders' making requesting practices: *support seeking frame* and *directing frame* (Figure 9).

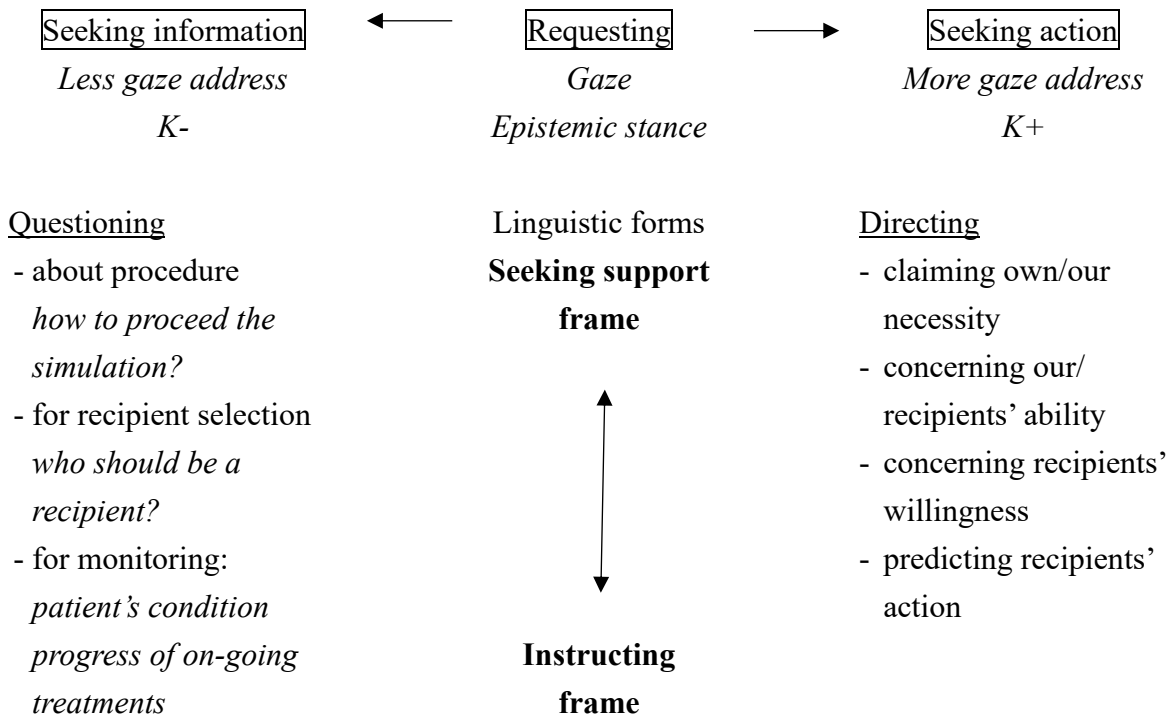

Figure 9: The requesting frame continuum in emergency care interaction

The two frames were observed in both leaders, but the former is more attributed to JD's requesting behaviours and the latter to SD's requesting. JD sometimes questions the settings or procedures of the simulation, e.g., "Do we have a trauma team?", and "Who is an appropriate recipient of a request?" in Episode 6. The negotiation of a recipient in a

requesting sequence became noticeable to researchers through the observation of JD's gaze behaviours. JD's instructions are more frequently realised by claiming their own or "our" necessity. While SD restricts the use of questioning to seeking information about patient's conditions and progress of on-going treatments. When instructing, SD distances himself from the team with the use of request strategies concerning recipients' willingness and predicting/suggesting actions (predictory/suggestory).

There are few cases where gaze address was not observed when they sought information (see Episode 7, 14.3% in SD and 27.5% in JD). Thus, different patterns were observed in the leaders' gaze behaviours when instructing (seeking action) and questioning (seeking information). In the former, the leaders used gaze address more frequently to monitor the execution of a requested action. While in the latter, especially when a *interactional space*, in which the interactants "coordinate in joint action" (Mondada 2013: 246), was already established in previous turns, they seemed to rely on their auditory sensory to listen to recipients' responses to questioning without gaze at recipients, which allows the leaders to sustain their gaze on the patient's body or the vital monitor screen.

7. Conclusion

This study examined how the team leaders accomplish and frame immediate requests through

multiple resources which include syntactic forms and corresponding eye-movement patterns in the emergency care simulations. Analysis of video, audio and eye-movement data revealed that SD made immediate requests to their members with multimodal emphasis, i.e., gazed at the recipients and addressed them verbally, especially when asking for recipients' action, while, JD often used only gaze in requesting.

While our study has limitations in the small size of the data, the results nevertheless contribute to identifying two frames: *support-seeking frame* (positioning himself in the team) and *directing frame* (distancing himself from the team) in the leaders' requesting. The leaders in different levels of expertise strategically utilised these frames to draw on necessary information/knowledge and actions for treatments, which were then ascribed either as a question or an instruction through co-construction of joint action with the members in this particular context. It is hoped this study can stimulate further exploration of gaze and multimodal behaviours in interaction in institutional settings and benefit medical education to enhance team performance in emergency care and beyond..

Acknowledgements:

This work was supported by JSPS KAKENHI Grant Number 17KT0062. We thank the participants for their kind contribution to the project

Appendix

Appendix 1: The setting

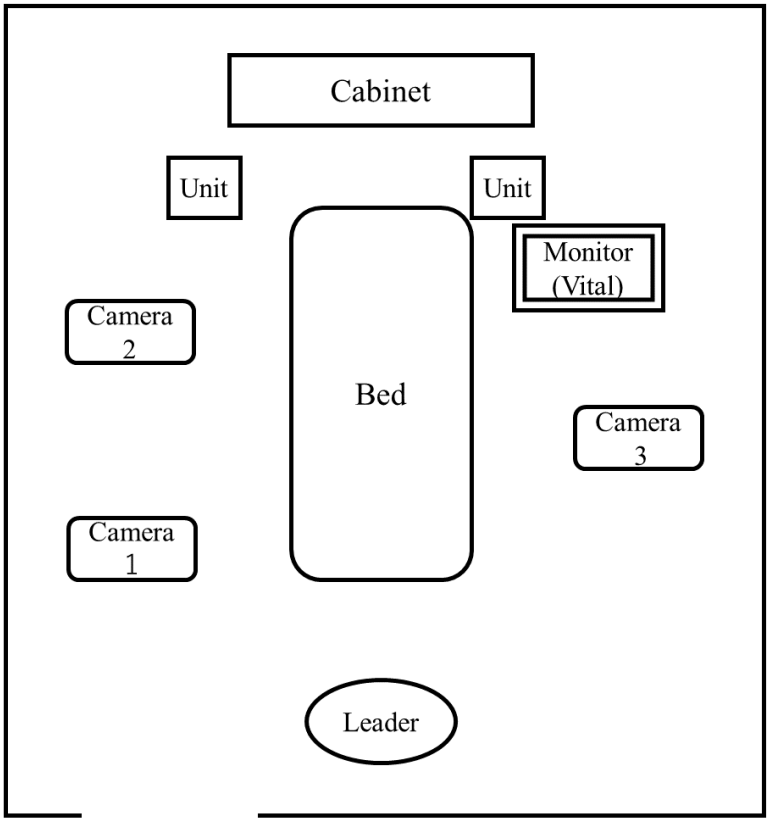

Figure 10: The setting of the simulation room

Appendix 2: Transcription conventions

Conventions	Symbol	Explanation
Time stamps	00: 00.0	Time stamps on the transcripts are shown in MM: SS.0.

Extralinguistic information	<$E>… </$E>	This includes laughter, coughs and transcribers' comments.
Unintelligible Speech	<$G?>	Unintelligible speech is marked with these brackets.
Guess	<$H>… </$H>	Where the accuracy of the transcription is uncertain, the sequence of words in question is placed between these two angle brackets.
Overlap	<$O1>… </$O1>	The overlap is indicated by numbered angle brackets.
Unfinished sentence	=	Unfinished sentences of any type are indicated with = sign at the end of unfinished utterances.
Gaze behaviours	<$F>….</$F>	Gaze behaviours are annotated in these brackets.

(Adapted from: Adolphs 2008: 137-138)

Appendix 3: Episode 6 JD's information seeking about "ourselves" (Extract 6 and Figure 7)

Extract 6 JD's seeking information about "us"

1 04:17.8 <$F> JD looks at the

2 the monitor in Figure 7-1 </$F>

3	04:18.0		<$F> JD looks at JN </$F>
4	04:18.2		<$F> JD looks at the
5			booklet in Figure 7-2 </$F>
6	04:18.4	JD	Erm
7	04:19.3	JD →	Do= we don't have a major
8			trauma team or do we?
9	04:19.9		<$F> JD looks at the
10			monitor </$F>
11	04:20.5		<$F> JD looks at the
12			booklet </$F>
13	04:21.8	JD	Or do we.
14	04:22.2		<$F> JD looks at JN </$F>
15	04:22.2		<$F> JN looks at JD </$F>
16	04:22.3	JD	Sorry I missed that.
17	04:23.2		<$F> JD looks at the
18			booklet </$F>
19	04:23.9	FD2	Er
20	04:24.4		<$F> JD looks at JN

21			in Figure 7-3 </$F>
22	04:24.6		<$F> JN looks at FD2
23			in Figure 7-3 </$F>
24	04:24.7	JD →	Can you activate
25			<$O>major haemorrhage=
26			er major </$O> trauma yet?
27	04:25.0	FD2	<$O>Yes yes </$O>
28	04:25.1		<$F> FD2 looks at JD
29			in Figure 7-4 </$F>
30	04:25.1		<$F> JD looks at FD2
31			in Figure 7-4 </$F>
32	04:26.1		<$F> JD looks at FD1 </$F>
33	04:26.4		<$F> JD looks at SN </$F>
34	04:26.6		<$F> JD looks at the
35			Patient </$F>
36	04:26.9		<$F> JN looks at JD </$F>
37	04:27.0		<$F> JD looks at SN </$F>
38	04:27.0	FD2	<$H> We'd better call? </$H>

39 04:27.3 <$F> JD looks at FD2 </$F>

40 04:27.3 <$F> JD looks at the

41 Patient </$F>

42 04:27.7 <$F> JD looks at JN </$F>

43 04:27.9 <$F> JD looks at FD2 </$F>

44 04:28.0 <$F> FD2 looks at JD </$F>

45 04:28.1 JD → Yeah that would be lovely.

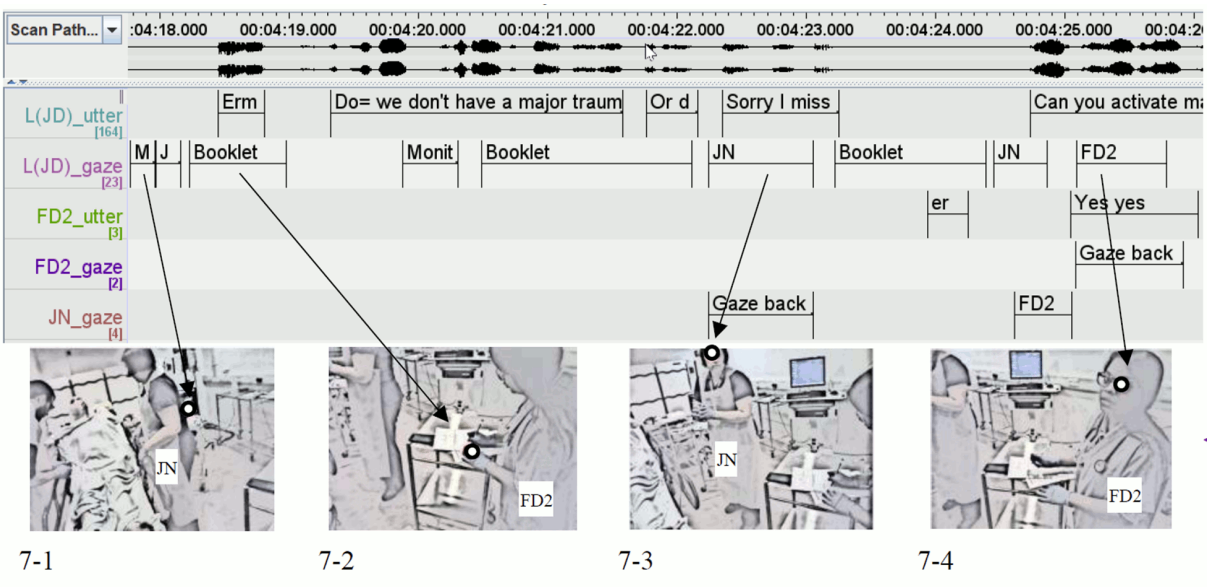

Figure 7: JD's information seeking about "us" in Extract 6

Appendix 4: Extract 7 SD's information seeking without gaze at a recipient (Extract 7 and Figure 8)

Extract 7 SD’s information seeking without gaze at a recipient

1	07:46.5		<$F> FD2 looks at SD </$F>
2	07:46.5	FD2	We've got the VBG
3			result <$G?>.
4	07:46.5		<$F> SD looks at FD2
5			in Figure 8-1 </$F>
6	07:47.4		<$F> SD looks at the
7			document in Figure 8-2 </$F>
8	07:48.1	SD	VBG
9	07:48.4		<$F> SD looks at the
10			patient's body </$F>
11	07:48.8	SD →	<$E> Name of FD2 </$E>
12			How many accesses we got now?
13			We got two?
14	07:49.0		<$F> SD looks at the
15			patient's arm in Figure 8-3 </$F>
16	07:49.4		<$F> SD looks at the Patient's
17			arm in Figure 8-4 </$F>

18	07:49.9		<$F> SD looks at the
19			patient's body </$F>
20	07:50.6		<$F> SD looks at the
21			patient's arm </$F>
22	07:51.2		<$F> SD looks at the
23			patient's body </$F>
24	07:51.4		<$F> SD looks at the
25			patient's arm </$F>
26	07:51.8	FD2	Two yeah two <$G?>

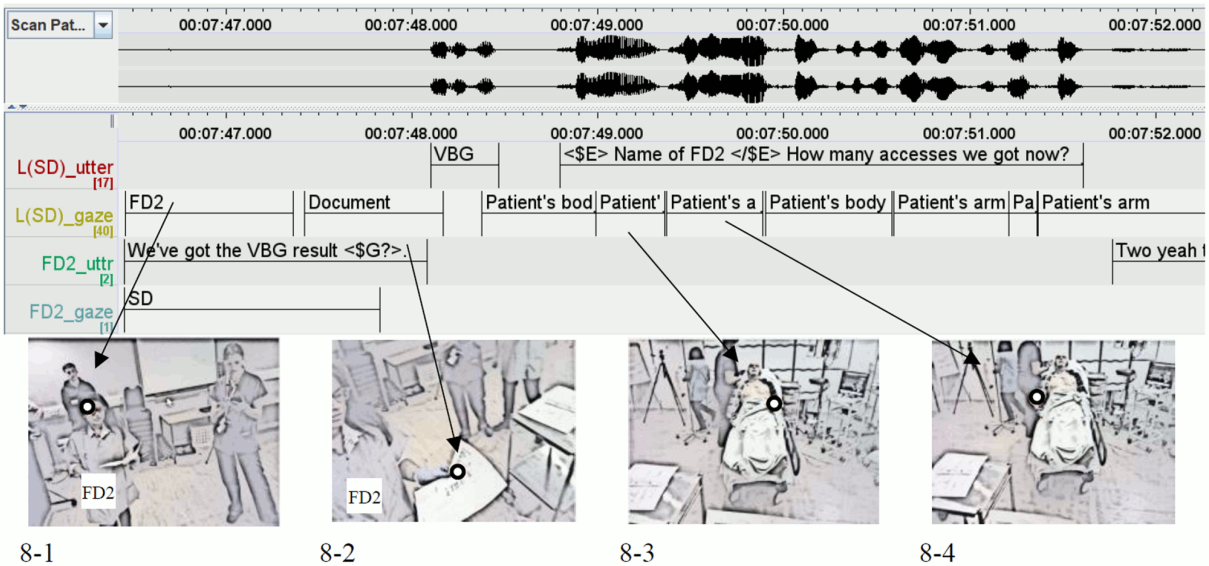

Figure 8: SD's seeking information without gaze at a recipient in Extract 7

References

Adolphs, Svenja (2008) *Corpus and Context: Investigating Pragmatic Functions in Spoken Discourse*. Amsterdam: John Benjamins Publishing Company.

Adolphs, Svenja and Ronald Carter (2013) *Spoken Corpus Linguistics: From Monomodal to Multimodal*. Abingdon: Routledge.

Adolphs, Svenja, Dawn Knight, and Ronald Carter (2011) Capturing context for heterogeneous corpus analysis, *International Journal of Corpus Linguistics,* 16: 305–324.

Allwood, Jens,Maria Bjornberg, Leif Gronqvist, Elisabeth Ahlsen, and Cajsa Ottesjo . (2000) The spoken language corpus at the department of linguistics, Göteborg University, *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research,* 1 (3): Art 9, http://www.qualitative-research.net/index.php/fqs/article/view/1026/2215.

Auer, Peter (2017) Gaze, addressee selection and turn-taking in three-party interaction, *Interaction and Linguistic Structures*, 60: 1-32.

Austin, John L. (1962) *How To Do Things With Words.* London: The Clarendon Press.

Baldry, Anthony and Paul J. Thibault (2006) Multimodal Corpus Linguistics, in Thompson Geoff and Susan Hunston (eds) *System and Corpus: Exploring Connections,* 164–183.

London: Equinox.

Bateson, Gregory (1972 [2000]) *Steps to an Ecology of Mind*. Chicago: The University of Chicago Press.

Blum-Kulka, Shoshana (1989) Playing it Safe: the Role of Conventionality in Indirectness. In Shoshana Blum-Kulka, Juliane House, and Gabriele Kasper (eds) *Cross-cultural Pragmatics: Requests and Apologies,* 37–70. Norwood, NJ: Ablex Publishing Corporation.

Blum-Kulka, Shoshana, Juliane House, and Gabriele Kasper (1989) *Cross-cultural Pragmatics: Requests and Apologies*. Norwood, NJ: Ablex Publishing Corporation.

Brown, Penelope and Stephen C. Levinson (1987) *Politeness: Some Universals in Language Usage.* Cambridge: Cambridge University Press.

Candlin, Christopher N. and Jennifer Lucas (1986) Interpretations and Explanations in Discourse: Modes of 'Advising' in Family Planning. In Titus Ensink, Arthur van Essen, and Ton van der Greest (eds) *Discourse Analysis and Public Life,* 13–38. Dordrecht: Foris Publications.

Candlin, Sally (2002) Taking risks: an indicator of expertise?, *Research on Language and Social Interaction,* 35 (2): 173–193.

Couper-Kuhlen, Elizabeth (2014) What does grammar tell us about action?, *Pragmatics,* 24

(3): 623–647.

Couper- Kuhlen, Elizabeth and Margret Selting (2018) *Interactional Linguistics: Studying Language in Social Interaction.* Cambridge: Cambridge University Press.

Deppermann, Arnulf (2013) Multimodal interaction from a conversation analytic perspective, *Journal of Pragmatics*, 46 (1): 1-7.

Drew, Paul and Elizabeth Couper- Kuhlen (2014) Requesting - from Speech Act to Recruitment. In Paul Drew and Elizabeth Couper- Kuhlen (eds), *Requesting in Social Interaction*, 1-34. Amsterdam: John Benjamins Publishing Company.

ELAN (2001-2015) ELAN Linguistic Annotator. Version 4.8.1 Nijmegen, The Netherlands: Max Planck Institute for Psycholinguistics, The Language Archive.

Frankel, Richard M. (1983) The Laying on of Hands: Aspects of the Organization of Gaze, Touch, and Talk in a Medical Encounter, in Sue Fisher and Alexandra Todd, D. (eds) *The Social Organization of Doctor-Patient Communication,* 19–54. Washington, D. C.: The Center for Applied Linguistics.

Goffman, Erving (1974) *Frame Analysis*. London: Harper and Row.

Heath, Christian (1986) *Body Movement and Speech in Medical Interaction*. Cambridge: Cambridge University Press.

Knight, Dawn (2011) *Multimodality and Active Listenership*. London: Continuum.

Levinson, Stephen C. (2013) Action Formation and Ascription, in Sidnell Jack and Tanya Stivers (eds) *The Handbook of Conversation Analysis,* 101–130. Chichester: Blackwell Publishing.

Mondada, Lorenza (2013) Interactional space and study of embodied talk-in-interaction. In: Peter Auer, Martin Hilpert, Anja Stukenbrock and Benedikt Szmrecsanyi (eds) *Space in Language and Linguistics: Geographical, Interactional and Cognitive Perspectives*, 247-275. Berlin: Walter de Gruyter.

Mondada, Lorenza (2014) Instructions in the operating room: How the surgeon directs their assistant's hands. *Discourse Studies*, 16(2), 131-161.

Sarangi, Srikant (2000) Activity Types, Discourse Types and Interactional Hybridity: the Case of Genetic Counselling, in Srikant Sarangi and Malcolm Coulthard(eds) *Discourse and Social Life,* 1-27. Harlow: Longman.

Searle, John R. (1969) *Speech Acts: An Essay in the Philosophy of Language*. Cambridge: Oxford University Press.

SMI (2017) SMI ETG2. Teltow: SensoMotoric Instruments GmbH.

Tannen, Deborah and Cynthia Wallat (1983) Doctor/Mother/Child Communication: Linguistic Analysis of a Pediatric Interaction, in Todd D. Alexandra and Sue Fisher (eds) *The Social Organization of Doctor-patient Communication,* 203–219. Washington, DC:

Center for Applied Linguistics.

Tomasello, Michael (1999) *The Cultural Origins of Human Cognition*. Cambridge, Massachusetts: Harvard University Press.

Tsuchiya, Keiko (2013) *Listenership Behaviours in Intercultural Encounters: A Time-aligned Multimodal Corpus Analysis*. Amsterdam: John Benjamins Publishing Company.

Walker, Traci S. and Paul Drew (2008) Contingency and action: a comparison of two forms of requesting, *Research on Language and Social Interaction,* 41 (2): 129–153.