THE UNIVERSITY of EDINBURGH

RESUSCITATION RESEARCH GROUP



TEAM INTERACTION IN CARDIAC ARREST RESUSCITATION

Chris Cummins · Ernisa Marzuki · Hannah Rohde · Holly Branigan

Panel on Social interaction in high stakes crisis situations

17th International Pragmatics Conference, Winterthur, 28 June 2021

Research context

- PhD project of Ernisa Marzuki
- Co-supervised by co-authors here and Gareth Clegg



- Research network emerging from this work, involving the University, the Scottish Ambulance Service, and the Resuscitation Research Group (RRG)

Resuscitation Research Group

- https://www.rrg.scot/
- Interests in the whole span of emergency medical response
- Areas for potential interdisciplinary work include
  - Efficient triage of emergency calls, given various sources of communication difficulty
  - Identifying cases with a high risk of deterioration
  - Managing bystander interventions in cardiac arrest (training, persuasion to attempt CPR, instructions for use of defibrillator, etc.)

Out-of-hospital cardiac arrest (OHCA)

- Recent example: Christian Eriksen
- Potentially sudden life-threatening event
  - Not to be confused with heart attack (myocardial infarction)
- Urgent medical attention required
  - Approximately 10% decrease in survival chances per minute of delay commencing chest compressions (Eisenberg et al., 2016)
  - Survival rate around 10% (10.3% across 27 European countries: Gräsner et al., 2016; Scotland 8.3%: Clegg et al., 2018)

OHCA in Edinburgh: the 3RU

- Paramedics deployed to suspected OHCAs are supplemented by Resuscitation Rapid Response Unit (3RU)
- (12) paramedics with specific training in OHCA
- Lead teams in OHCA setting
- Scenario varies considerably, as does complexity of task and corresponding challenges

Team interaction

- Ad hoc teams comprising two paramedics plus the (even more highly trained) 3RU paramedic
- Various challenges ensue
  - Balancing politeness/facework with efficiency, especially when telling colleagues what to do
  - Maintaining situation awareness in a time-critical environment
  - Training paramedics for these tasks, especially given that the simulated environment lacks emotional fidelity

Work so far

- Ernisa Marzuki's PhD project
  - Transcriptions of 40 real-life OHCA interactions (first five minutes after arrival of 3RU paramedic)
  - Annotated using bespoke coding scheme derived principally from DAMSL (Core and Allen, 1997) and GMIAS (Laws et al., 2009)

Overarching question and subquestions

- Is the interaction working as well as it can?

- Obviously difficult to operationalise (we welcome input on this!)
- Some of the subquestions we're trying to approach:
  - Is closed-loop communication helpful, and is it used?
  - Do high-performing teams differ discernibly from low-performing teams?
  - Do simulated interactions pattern with real-life interactions?

Closed-loop communication (CLC)

- Verbal message (‘callout’) + acknowledgement (‘checkback’) + confirmation

```
Sender:   John, could you get 20 ml saline solution?
Receiver: Okay Mark, I’ll get 20 ml saline solution.
Sender:   Thanks.
```

- Widely recommended for interactions of this kind: avoids messages being dropped or not actioned
  - `Let’s intubate.`
  - `We need to do chest compressions.`
  - `If you’ve got a cannula, then get a 20 ml syringe ready.`

Closed-loop communication (CLC)

- Despite this, very few instances of fully-fledged CLC in our data
- Suggests that the paramedics may be resolving the precision-economy trade-off in a different way (not necessarily wrongly)
  - Also possible that the loop can be closed multimodally, e.g. because it's common ground that someone is performing the requested task
  - However, that does create a potential point of failure

Impact of non-technical skills (NTS)

- Examined whether the teams given high NTS ratings acted differently from those given low ratings, as regards these data
- Not enough data for statistically robust findings in a post hoc analysis, but some interesting trends: high NTS groups
  - verbalised state awareness more frequently
  - verbalised plan of action more frequently, particularly with reference to non-immediate actions
  - produced higher rates of affective-performatives (= “utterances containing explicit gratitude, apology, compliment or curses”)
  - talked more about chest compressions and rhythm, and stopped talking about patient history sooner

Impact of non-technical skills (NTS)

- This could correspond to a nexus of features that make the interaction more effective
- However, need to bear in mind that these are ratings, and we may be documenting the behaviour that yields more favourable ratings
  - Relationship between high NTS ratings and good outcomes yet to be firmly established

Simulations

- Broad issue of whether these are sufficiently faithful to real-life resuscitation events
- On the basis of very preliminary data so far, there appear to be appreciable differences
  - e.g. very low rates of affective-performatives in simulation – perhaps related to the lack of emotional fidelity?
  - On this point, dialogues in resuscitations rated favourably in simulation don't closely resemble those evaluated favourably in real life

Where next?

- Quantitative evidence to support interventions
  - How to gather, transcribe and annotate sufficient data
  - Working with colleagues in Informatics and elsewhere to try to address these challenges
- Qualitative analysis – what can we glean from the data?

Settings for multimodal interaction

https://homepages.inf.ed.ac.uk/rpetrick/projects/james/overview.html

https://www.rrg.scot/projects/3ru/

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