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When seconds count: A study of communication variables in the opening segment of emergency calls

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Abstract

The opening sequence of an emergency call influences the efficiency of the ambulance dispatch time. The greeting sequences in 105 calls to a South African emergency service were analysed. Initial results suggested the advantage of a specific two-part opening sequence. An on-site experiment aimed at improving call efficiency was conducted during one shift (1100 calls). Results indicated reduced conversational repairs and a significant reduction of 4 seconds in mean call length. Implications for systems and training are derived.

Keywords

communication variables, emergency calls, emergency medical services, opening sequence, South Africa

Introduction

When someone telephones for an ambulance, an interaction ensues which should be efficient and effective along a number of dimensions. The call-taker (CT) is required to ascertain and record contact details of the caller, a geographic location as well as sufficient detail pertaining to the medical condition of the patient. This will facilitate a speedy dispatch of the appropriate level of vehicle, equipment and personnel to where it is needed. The process begins with an opening sequence which typically identifies the organisation, introduces the CT and invites the caller to proceed with the business of the call. How this phase is negotiated between caller and CT is an important framing feature for the rest of the call and has been studied in many different Emergency Service contexts (Koole and Verberg, 2017; Baker et al., 2005; Whalen et al., 1988). However, little is known about this

process in the South African setting – a context with a unique socio-political, demographic, illness and linguistic profile. As such, this forms a promising context for the field of health psychology.

This article reports on a study which forms part of a larger investigation on communication processes in government emergency medical services (EMS) in the Western Cape. This centre takes on average 1800 calls a day, some of which are from third parties such as cell phone company

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agents or nurses requesting trauma care or inter-hospital transfers for members of the public, and some of which are directly from the public (first party callers). CT training is done via a provincial course which covers listening and telephone skills, legal liabilities, roles and responsibilities as well as emergency first aid.

The structure and systems in this setting are profoundly affected by the unique profile of the Western Cape. Trauma has been documented as the second largest cause of death in the Cape (Gottschalk et al., 2006). The increase of diseases like HIV, tuberculosis, heart disease, malnutrition, maternal death and cancer (Coovadia et al., 2009; Gottschalk et al., 2006) further add to the EMS burden. Their service area includes informal settlements, as well as rural farming areas, many of which are not on maps or global positioning system (GPS) systems. Societal difficulties of violence, poverty, unemployment, alcoholism and drug abuse are common (Sun et al., 2012).

This region has a mixed language profile. Afrikaans is the most commonly spoken language (55.3%) followed by isiXhosa (23.7%) and English (19.3%). There is a relatively high number of isiXhosa-speaking citizens with poor English or Afrikaans, as well as migrants from other African countries (Lehohla, 2006). CTs are specifically selected and trained to handle the multilingual setting but the official language of the call centre is English.

The EMS has an automated system which records calls and by every account is delivering a service which is very effective in relation to government services run by other provinces in the country (Wallis, 2011). There are nonetheless several challenges within the system which include resource limitations and emigration of paramedical staff (Govender et al., 2012).

Critical to understanding the call process is an awareness of the communication variables at play (Higgins et al., 2001). Prior research suggests that a microanalysis of the interaction can identify barriers to effective call management and provide direction for training (Hepburn et al., 2014; Sacks, 1992; Zimmerman, 1992). We used a conversation analytic (CA)

framework to study communication variables. Schegloff (2007) describes the basic organising principle of interaction as being an action pair consisting of two related actions known as 'adjacency pairs' performed by two interacting persons such as question-answer, greeting-greeting or invitation-acceptance. In the EMS calls, we see an adjacency pair in which the CT invites the caller to report an incident, and the caller responds. However, when the caller has a problem with the opening move of this action pair, this will need to be solved before the invitation can be responded to.

Zimmerman (1992) pointed out that the design of the opening sequence is specific to the organisation in which it is used. Based on observations at the call centre, interviews with supervisors and an examination of current training protocols, the opening turn at the South African EMS centre was expected to comprise three components. CTs are instructed to include the following: (1) identify the institution ('EMS'), (2) a personal identification (*name of the CT 'speaking'*) and (3) an invitation to the caller to present the emergency ('what is your emergency?'). Each element is explained to trainee CTs and is linked to South African 'Batho Pele' principles of accountability. Batho Pele is a Pedi phrase which means 'people first'. It outlines principles designed to guide acceptable policy and legislation regarding service delivery in the public service (Public Service Commission, 2014).

Our research unit was invited to undertake an analysis of the communication behaviours in the call centre. Our overall objective was to assist with the accuracy and efficacy of communication exchanges between all members of the EMS team. The goals of this specific project were to ascertain the impact of the CT's identification sequence on the progression of the call and to determine whether there was a means of streamlining the interaction in order to ensure efficient communication and dispatch time.

Method

Ethics clearance was obtained from the Human Research Ethics Committee at the University of

the Witwatersrand and permission was obtained from the call centre. Each participant in the project was informed about the purpose of the study and was offered the opportunity to decline. All caller data were anonymised in write-up of results.

We examined the opening sequences of 105 recorded calls which were made to the call centre. Of these, 77 were third party callers, that is, a person calling on behalf of a patient, and 28 of these calls were first party callers, that is, from the public. In 12 cases, the call was transferred from the third party caller back to the member of the public (first party caller) which allowed an examination of shifts in CT opening behaviours as the call progressed. We drew these calls from the following EMS-generated categories: *trauma, maternity, patient unresponsive, call backs and teenage pregnancies*.

A qualitative framework of evaluation was used. This was based on CA principles which have been useful in the examination of calls to emergency services in other countries (Higgins et al., 2001; Wakin and Zimmerman, 1999; Whalen et al., 1988). The opening sequences of the calls were analysed. These consisted of everything from the time the call was answered up until the caller's statement of the problem. Each opening was played back to a group of 2–4 judges. Consensus on interactional features was reached for the components of the opening. Attention was given to the structural organisation of, and variations in, the CT's opening turn, features of callers' immediate responses related to the institutional identification produced by CTs and features of callers' immediate responses related to the personal identification (or lack thereof) produced by CTs.

Following the analysis of the openings, a trial modification to the openings was implemented through an on-site experiment. This occurred over a 12-hour shift. The shift comprised 1100 calls and the mean length of these calls was compared with the mean length of calls for the same shift (1170 calls) for the day before (derived from the data base). The data were quantitatively analysed for the seven CTs who were present on both days in terms of

length of calls and ambulance dispatch times. A chi-square test was used to determine whether there was a significant difference between the pre- and post-intervention average call length. These were linked to EMS performance indicators which aim to dispatch an ambulance for the most urgent calls (priority one) within 5 minutes, and arrive on scene within 15 minutes.

We also observed the process and using a brief questionnaire, gauged the opinions of the CTs about the impact and ease of use of the openings modification.

Results

Structure and description of the original openings

Despite the presence of a prescribed three-part initiating sequence, a considerable variation in practice emerged in the pre-intervention calls. The relative distribution of these types of openings is portrayed in Figure 1 and examples are provided in Table 1. The graph demonstrates that the recommended protocol was being followed in about half of the calls examined.

As seen in Figure 1, there was a preference for certain types of openings. In all types, the opening phrase was typically pronounced at a rapid pace, often making it unintelligible. The three-part opening phrase was the most common ($N=56$). This consisted of any of the following: (1) the institutional identification (e.g. *EMS/ambulance /ambulance control /medical services*); (2) a personal identification (e.g. *Susan speaking*); (3) an invitation to present the emergency (e.g. *What's your emergency?/How may I help you?/How may I assist?*); (4) a greeting (e.g. *Hello/Good morning/Good day*). The second most popular exchange was a two-part opening phrase ($N=47$). This typically contained two identifications, the institutional identification followed by the name of the CT, without an invitation to present the emergency. There was one four-part opening which consisted of (1) the institutional identification, (2) a

Figure 1. Pre training variation in the opening sequence of the calls.

Table 1. Examples of variation in call-taker openings.

Opening type	Content	Time (seconds)
1 part	Good morning	1
2 part	Emergency medical services Lettie speaking?	2
2 part	Ambulance= (control)= g' day:?	1.5
3 part	Emergency medical services Tertia speaking how can I help you:	2.5
4 part	Ambulance services g'day Madeline speaking >how = may = I = help<?	2
4 part	<Ambulance control > good morning (Daleen) speaking how can I help you	3

greeting (3), a personal identification and (4) an invitation to present the emergency. The solitary instance of a one-part opening consisted of a greeting. Examples are provided in Table 1. We have used Jefferson’s (2004) transcription notations in the relevant extracts (Appendix 1).

While Koole and Verberg (2017) noted that in a Dutch emergency centre, lengthier introductions caused overlap with the caller, this was not observed in this data where there was only one interruption from a first party (P1) caller which occurred in a relatively short, two-part opening.

The effectiveness of the opening sequence is possible to determine from the caller’s response and the following trends were noted.

Repair sequences

A difference was noted between the calls made by first party (P1) and third party (P3) callers. The third party interaction formed the bulk of calls. While third party callers had no difficulty recognising the institutional identification phrase ‘emergency medical services’, we found some evidence to suggest that this may cause confusion for first party inexperienced callers. Callers initiate repair in response to the opening phrase by inquiring if this is the ‘ambulance service’. Out of a total of 28 first party callers, 10 required clarification or repetition of the institutional identification. This is illustrated in extract 1 where the first party caller checks

whether she has reached the correct service (line 2):

(1) Call 007

CT: This is emergency=medical service
Tshego hello:?

P1: Hi. Is that the ambulance service?

Conversational repairs were not limited to first party callers and were also initiated by third party callers if no CT name was given. The CT did not include a personal identification in only 7 of the 105 calls. The third party caller requested the CT's name in four of these seven instances. This may be related to accountability issues which require personal identification of medical personnel. The importance of personal identification is illustrated in extract 2 where the name is requested in line 2:

(2) Call 543

CT: Emergency medical services how may I help you?

P3: Hello Wallyoneohseven who'm I speaking to?

CT: Mo:lly?

P3: Hi Molly. maternity

Sometimes after the opening, there was a silence from the first party caller followed by the CT pursuing a response to check if the caller was still on the line, for example, 'Hello?' Other reasons for repair initiation were from the caller and were related to poor intelligibility. In third party callers, this occurred around personal identification. For example in extract 3, the CT name is repeated in line 3 and again in line 5:

(3) Call 306

CT: Ambulance services g'day Rachel speaking

P3: Hi Andrewoneohseven I'm speaking to?

CT: Rachel?

P3: Sorry?

P3: Rachel

Greeting sequences

Both members of the public and third party callers often moved into an extended greeting sequence such as *A: how are you? B: fine. B: and yourself? A: I'm fine thank you.*

Whalen and Zimmerman (1987) describe openings as being 'reduced' through the omission of social features like greeting exchanges. Considering the time urgency of emergency calls, it was thus surprising that such extended greetings occurred in as many as 12 of the 105 calls. The greeting function seemed to vary by caller and occurred across first and third party exchanges. In the case of inexperienced callers, it may well be a cultural phenomenon or a need to revert to what is familiar when faced with a potentially stressful, unknown situation. This was quite skilfully and rapidly handed by the CTs who moved straight into the business of the call by engaging in a 'how may I help you?' sequence. In the case of third party callers who recognised the name of the CT, a recognition sequence ensued prior to the business of the call.

Medical jargon

Also emerging in a third party call was a rapid identification of the problem using mutually recognised medical jargon or abbreviations such as 'BBA' (born before arrival) and single words to denote the type of emergency, for example, 'I have a maternity'.

Language shift requests

In 12 cases, there was a negotiation of language rules for the conversation when there was a mismatch between the language of caller and CT. Most commonly, this shift was negotiated by the CT by seamlessly changing the call language to suit the caller. This adaption is illustrated below where the CT changes to Afrikaans in line 3 without a break in proceedings:

(4) Call 198

CT: This is medical service Sharon speaking what's your emergency?

P1: Uh goei more mevrou. uh ons het nou dringend 'n ambula:ns nodig? Uh good morning madam. uh we now urgently need an ambulance

CT: Okay wat is die adres daar mevrou? Okay what is the address there madam?

(an') how can I help you?
(0.3)

P1: I'm- I'm ↑Candy,
(0.5)

CT: ↑Hi:?
(0.8)

P1: Um: I'm looking for a ambulance (for me)
please

Transfer calls

In 12 of the calls analysed, the call was initially made by a third party and then a request was made for the CT to speak directly to the member of the public (first party). Such instances provided the opportunity to see how the CT modified the identifying sequence and accommodated to the needs of the lay person. Interestingly in all such instances, the opening segment changed. They were simplified (in terms of length) and more personable. We noted a preference for the use of the identification 'ambulance service' to re-open the call.

CTs appeared to re-open the call with first party callers without a personal identification in 50 per cent ($N=6$) of the transferred calls. This was in contrast to their initial opening sequences which omitted their name in only 7 out of the 105 calls (6.6%). The first party callers also did not request the name of the CT in any of their interactions. The personal identification omission thus appeared to be an adjustment to first party caller expectations. This is illustrated in extract 5:

(5) Call 854

CT: Emergency medical services
how may I help you?

P3: Good day I'm calling from Vodacom. =
=I have a caller from Cape Town,
could I send the caller through

CT: >You can put the caller< through,
↑thank you?<

P1: Thank you caller for holding you
through
(to) Cape Town ambulance,
(.)

P1: Hello?

CT: >Ambulance services< good evening,

The CT does not offer her name even when social conventions may suggest it is the required response when the caller provides her name (line 15). Following a pause which may have been a cue for the CT to provide her name, the caller then proceeds to the business of her call (line 19) without a request for CT identification.

Institutional identification also changed. Extract 5 illustrates that the CT initially uses the terminology 'emergency medical service' (line 1), but when the caller indicates that she is going to transfer the call to a non-professional (line 5) 'someone who needs to talk to you?' the CT re-opens the call with the recipient-designed identification 'ambulance services' (line 9). This evidence suggests a mutual orientation of both CTs and first party callers to the service the centre offers, that is, 'ambulance service' rather than the identification in terms of the official name of the call centre. This is further illustrated by extract 6 where the CT answers the phone without knowing who the caller is. As seen in this extract, prescribed institutional identification (EMS) was problematic as it often lead to a call that was two turns longer than it should have been, because of the sequence which initiated and repaired it (lines 2 and 3):

(6) Call 007

CT: This is emergency=medical service
Tshego hello:?

P1: Hi. is that the ambulance service?

CT: Ye:s

P1: Uhm I need an ambulance please?

The above analysis provided clear evidence for the interactional benefits of a two-part

opening over the prescribed three-part opening sequence. The calls analysed suggested the potential benefits of an alternative identification 'ambulance service' to the emergency call centre. Similarly, the callers presented the emergency once they had established they had the right institution and thus the element of the recommended introduction (*what is your emergency?*) seemed redundant. The above evidence pointed towards a mutual orientation of both CTs and first party callers to the service as an 'ambulance service' as well as the value of a name in the identification sequence. It was hypothesised the inclusion of these elements would decrease the number of repair sequences and thereby decrease the length of the call.

The intervention

The on-site experiment which was implemented enabled us to measure the benefit of the modification to opening sequence. During a 12-hour shift in which the CTs were requested to change their identification sequence from the prescribed three-part opening to a two-part opening with the following words: 'Ambulance service, (name) speaking'. They were given a written instruction in large letters which they affixed at their workstation and during the day were reminded periodically (through verbal coaching by two of the researchers) to apply the new identification sequence. A mean 4 second advantage across 1100 calls was achieved in the duration of calls after the intervention.

Table 2 shows the number of calls received during a 12-hour shift in the centre on day 1 (before the intervention) and day 2 (intervention day). The type of calls and the proportion of priority 1 calls on each day were found to be equivalent ($Z=0.95$; $p>0.05$). The table reflects the average call length and the number of calls managed across both days. The mean length of calls across all CTs differed significantly between days 1 and 2 ($p<0.05$). After the intervention, the mean call time (across 1100 calls) was reduced by 4 seconds. For Priority 1 calls, an improvement was also noted in the dispatch

time under 5 minutes and the response time under 15 minutes, (indices of performance used by the centre). This improvement was, however, not significant on this sample size.

The positive results of the intervention were also reflected in affirmative responses from the CTs when interviewed after the experiment and included the following comments:

'It made calls much shorter. I am still using it today'

'It saves time'

'I have no problems with callers'

'Keep the name- it softens the call'

'It gets to the point eetatu' (it helps a lot)

Discussion

The results suggest that despite an explicit recommended protocol, call-takers (CTs) deal with the opening phase of emergency calls in different ways. The natural practice of the experienced CTs had evolved pragmatically and there is no evidence that the current recommended identification sequence improves understanding of the emergency or response time. As Hepburn et al (2014) recommend, the role of our research was to analyse this expertise, and refine it into a workable strategy. Higgins et al. (2001) have suggested that a significant proportion of call difficulties lie in communication variables, and the need for a clear understanding of such variables is asserted in this study. An examination of requests for clarification and the observed differences in interactive behaviours between first and third party callers leads to the identification of the least problematic opening sequence. The on-site experiment informed by these findings was notably effective in reducing average length of call.

It would appear that the recommended combination minimised requests for clarification and in a bilingual environment (because of the close approximation of the English term 'ambulance' and Afrikaans 'ambulans')

Table 2. Call data for same shift of call-takers across 2 days.

Elements	Day 1 (pre-intervention)		Day 2 (post-intervention)	
	Mean length of call	No of calls	Mean length of call	No of calls
Total calls		1170		1100
Average call length	2 minutes 9 seconds		2 minutes 5 seconds	
Dispatch time < 5 minutes	87.89%		91.79%	
Response time < 15 minutes	71.36%		79.27%	
First person call volume	220		195	

*Significant difference ($Z=0.95$; $p>0.05$).

is probably more accessible to callers (both first and third party). The inclusion of the CT's name appears to satisfy the need for efficient recognition (when it is a third party caller) and provided a personalised and accountable service for members of the public. Overall, the two-part opening minimises the length of the identification sequences and the time taken to the progression of the next stage of the call (description of the problem) – a time advantage which hopefully persists through the system until the ambulance arrives at the scene.

The findings demonstrate the utility of a Conversation Analysis (CA) approach and the value that this approach has in public health issues. New methods of analysis and description are suggested as well as a new focus on such issues in training protocols. As demonstrated here, communication factors enable accuracy and reduced response time and should be acknowledged as a priority in training and monitoring. Shaving off even a few seconds between answering the call and the dispatch of the ambulance may have life-saving consequences in this context.

Any proposed changes to policy and systems should be based on the evidence of such intervention studies (Hardcastle, 2011) and will hopefully impact to improve a critical aspect of our society. Our work will continue at this site to explore the outcome of communication variables on other aspects of the system with a view to informing development plans transferable across other sites.

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Appendix I

Glossary of transcript symbols

The following transcript symbols were taken from the Jeffersonian notation system (Jefferson, 2004).

=	An equals sign	To indicate there is no interval between adjacent utterances, the second being latched immediately to the first
.	A full stop	A pause in conversation
:	A colon	An extension of the sound or syllable it follows
?	A question mark	A rising inflection, not necessarily a question
—	Underlining	Vocal emphasis is indicated by the syllables underlined
(())	Double parentheses	Comments made by the transcribers
<word>	Left, right carats	A word pronounced at a slower speed than the surrounding talk
>word<	Right, left carats	A word pronounced at a higher speed than the surrounding talk
↑	An arrow pointing upwards	There is a rising syllable intonation on the word