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It's a two way street: Striking the balance between routinisation and responsiveness in emergency calls

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A research report submitted in partial fulfilment of the requirements for the degree of Master of Arts by Coursework and Research Report, Psychology in the Faculty of Humanities, University of the Witwatersrand

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Abstract

A call taker is the first point of contact in the emergency service system and thus the interface between the caller and ambulance dispatch. Misunderstandings in an emergency call have implications for the survival of patients. Using an applied conversation analytic approach this study examined participants' use of conversational repair as an interactional strategy. Data included 101 calls from a South African emergency medical services call centre. The data set was comprised of two distinct subsets, namely: the 107 and public corpora. The 107 corpus (53 calls) contained calls from a general emergency call centre. The 107 caller thus served as a mediating party on behalf of the public caller. The public corpus (48 calls) comprised calls received directly from members of the public. The data subsets afforded a unique opportunity to analyse ways in which participants to an emergency call manage asymmetries of knowledge. Differential patterns of the type and purpose of repair were tracked across both data sets and similarities and differences were explored. Both data sets showed that participants' choice of interactional strategies was customized based on an ongoing assessment of knowledge asymmetries. However, whilst knowledge asymmetries posed some constraints an overriding interactional constraint, inherent within the institutional nature of the emergency call, was a rigid adherence to routinized protocols. The call taker's dilemma was thus identified as the management of these constraints through the frequent use of conversational repair. Although a level of responsiveness is required to glean quality information from callers, high volumes of emergency calls would not be possible without routinized protocols. However, increased orientation to routinized protocols led to a decreased orientation to responsiveness. This research therefore showed that knowledge symmetry is not necessarily more advantageous but that successful call trajectory is reliant on the call taker's ability to maximize the collaborative nature of the interaction and effectively negotiate through the judicious use of repair and other relevant interactional strategies. This has important implications for call taker training.

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Chapter 1 – Introduction

In South Africa access to healthcare is regarded as a human right for all citizens. This is in accordance with The Bill of Rights (1996) of the Constitution of the Republic of South Africa. For many of the most vulnerable members of South African society, the poor and previously disenfranchised, access to healthcare in the event of a medical emergency is contingent on ambulance transfer to a hospital or clinic. However, a key determiner in providing a successful emergency transfer service is the *quality of information* gleaned by the emergency call taker (Mulligan, 2009). Inaccurate or incomplete information can result in the delay of an ambulance or worse, an ambulance not reaching the required destination at all. For the patient this could translate into a matter of life or death.

As the first point of contact in the emergency service system the call taker is the interface between members of the public and dispatch personnel and as such she/he is responsible for obtaining information that is as accurate as possible. This study concerns this vital task of the emergency call taker. However, because an emergency call is a highly collaborative two-way process, call takers repeatedly encounter a host of interactional challenges in spite of well-established protocols. In an attempt to better understand these challenges this project explored a data set comprising 101 real-life emergency calls obtained from the Emergency Medical Services Centre of the Western Cape. The data set afforded a unique analytic opportunity in that it was comprised of two distinct subsets, namely: a 107 and public corpora. The 107 corpus (53 calls) contained calls received from a general emergency call centre. The 107 caller was thus a mediating party acting on behalf of the public caller. The public corpus (48 calls) comprised of calls received directly from members of the public. The two data sets were clearly differentiated based on asymmetries of knowledge of emergency call protocols. This enabled a comparison of interactional patterns as guided broadly by the two distinguishable recipient designs. Whilst asymmetries of interaction in emergency calls has been well established in the emergency call literature (Heritage & Clayman, 2010), a comparison of how differing levels of asymmetries are managed and play out in the interaction has not been explored and explicated.

From initial analysis of the data conversational repair was identified as a frequently used interactional strategy within both datasets. Thus repair was used to provide an analytic focus across the two data sets. Repair is the conversation analytic term for how participants deal with problems that arise in conversation whether it be due to speaker trouble or recipient recognition (hearing or understanding),

(Lerner & Kitzinger, 2007). Differential patterns of the type and purpose of repair used were then tracked across both corpora and similarities and differences were explored.

The three main reasons for the choice of the exploration of emergency calls for this study were firstly that this project forms part of a broader study being undertaken under the auspices of the Health Communication Research Unit based in the School of Human and Community Development of the University of the Witwatersrand. This unit is a multidisciplinary research group concerned with the unique challenges of multilingual and intercultural communication in the South African healthcare context. The main goal of the unit is to apply methods from the social sciences to investigate communication practices across healthcare domains and sites, with a view to influencing theory, formulating recommendations for policy and practice and developing and implementing site-specific training programmes. In line with the aforementioned goals, negotiations were undertaken with relevant stakeholders to establish the Emergency Medical Services Centre of the Western Cape as a research site with a view to piloting, amongst others, a call taker training programme.

Secondly, the researcher's personal interest in this project was piqued because of the potential utility of the findings of this study. Until recently there have been tendencies in many parts of the world to develop primary health care perhaps even at the expense of developing effective emergency medical systems (Anthony, 2011). In a similar vein, historically, health communication research and in particular research using a conversation analytic approach, focused on one-on-one, face-to-face interaction and in particular doctor-patient interaction (Barnes, 2005). The practical applications of such studies have ranged from improved question design to increased sensitivity to the patient experience. This served as an inspiration to replicate such a utility of findings for emergency call takers. Thus this study was conducted with a view to highlighting interactional competencies and potential pitfalls (Psathas, 1990) possibly feeding into methods of training for emergency call takers. This project afforded a rare opportunity when conducting research at a master's level.

Thirdly, the project became increasingly interesting and meaningful with the discovery of conversational repair as a means of establishing understanding. Mutual understanding, which results in interactional smoothness, is not something that can be taken for granted and particularly so in the diverse South African landscape. The Western Cape has a unique demographic profile which can be viewed as adding unique layers of complexity to the task of the emergency call taker serving these particular

communities. Complexities range from time pressures due to ever increasing demands on the public health system to potential language barriers and even geographic constraints. Thus diversity potentially translates into manifold variables and the question that begs is how to undertake a sufficiently systematic analysis of emergency calls in this particular South African context. It is precisely the systematic approach of conversation analysis which qualified it as a useful approach for this study. In addition, the application of conversation analysis to emergency calls has been well established internationally by the pioneering work of Zimmerman and colleagues (Heritage & Clayman, 2010).

The underlying constructivist ontology and epistemology of conversation analysis assumes a collaborative nature of social reality and has as its central concern the competencies or strategies which participants use in social interaction. Through this lens interaction is regarded as a form of social organisation through which the work of seeking and finding help gets done (Atkinson & Heritage, 1984). A unique feature of the approach used for this research was its dialogic nature which made use of sequential contributions of the emergency call taker and caller for analytic purposes (Perakyla, 1997). Importantly, the researcher could explore the response of a participant to any given prior turn in the conversation and in so doing establish what participants were orienting to, whether understanding was achieved and what strategies were used to achieve this understanding (Atkinson & Heritage, 1984).

Chapter 2 – Literature Review

Emergency medical systems in the developing world

The infrastructure of emergency medical systems around the world varies from country to country according to differences in community structures. Broadly speaking current models include: the North American model whereby the patient is transported by ambulance to the hospital and paramedics fulfill the role of pre-hospital caregivers; the Franco-German model in which physicians are used as pre-hospital care givers i.e. the doctor goes to the patient; and the model for the densely populated city of Hong Kong whereby motorcycles are equipped to reach and assist patients while waiting for ambulance transportation to the hospital (Anthony, 2011).

Anthony (2011) purports that despite increased inclusion of emergency medical care in global health policies, these systems remain significantly underdeveloped in many African countries. However, having said that he goes on to note that major discrepancies exist in the developing world. Mozambique established emergency care systems as a priority as early as 1979 and Ethiopia, in collaboration with identified partners, instigated training programmes for emergency medical care workers. This is in stark contrast to for example, Tanzania in which no emergency transportation exists resulting in a "maternal mortality rate 300 times greater than northern Europe" (Anthony, 2011, p. 908). South Africa follows the North American model and is well positioned for the future in that as of 2003 emergency medicine, including emergency care in pre-hospital environments, was recognized as a speciality. South African paramedics are highly regarded internationally and considered to have greater clinical experience than their overseas counterparts (Wallis, Garach, & Kropman, 2008). However, South African emergency medical services face increasing demands/challenges due to the burden of disease and trauma. Research has shown that the success of an emergency medical care system lies in its ability to adapt to local demands (Anthony, 2011). Thus it is imperative for South African researchers to understand emergency medical care in the South African context, including differences ranging from community to community. The data used in this project was obtained from the Emergency Medical Services (EMS) centre of the Western Cape and as such analysis of phenomena more specifically pertains to communities in the Western Cape. The issues affecting the delivery of emergency medical services in the Western Cape will broadly be categorized and discussed under three headings, namely: increasing demand and constraints on resources, geographical constraints and language constraints.

Increasing demand and constraints on resources

Citizens' rights to access health care, justifiably raises questions of resource availability. The South African health care system has two broad distinctions namely: private and public. The private health care sector is well resourced versus a struggling public sector. A primary factor leading to increased demand on the public health care system is the substantial proportion of the South African population which does not have medical aid coverage and are thus dependent on the public sector for health services. Persistent inequalities continue to plague the South African health care system. Statistics for 2010 showed that only 17.6% of all South Africans, across all race groups, were covered by a medical aid scheme (Mayosi, Lawn, van Niekerk, Bradshaw, Abdool-Karim, & Coovadia, 2012). This was only a 1.6% increase from 2008. However, of major concern is the unequal distribution of such coverage for the different race groups. Whereas 70.9% of the White and 46.8% of the Indian populations had medical aid coverage, only 10.3% of the Black and 21.8% of the Coloured populations had coverage.

Such inequities in the system are largely due to high levels of unemployment and concomitant poverty which is also a significant contributor to increasing levels of disease and trauma incidents. Approximately 33% of South African emergency admissions are trauma related compared to 12% in the United States of America and 8% in the United Kingdom (Wallis, Garach, & Kropman, 2008). It is because of pervasive inequities in the two-tiered South African health system (private versus public) that the National health insurance will be phased in over a number of years so as to promote more equitable and effective health care services.

In the public sector, emergency medical services are co-ordinated on a provincial basis and the Western Cape Emergency Medical Services centre alone, transported an estimated 454 850 patients in 2012/2013. 66% of urban *priority 1*[1] calls were responded to within 15 minutes whereas 87.3% of rural *priority 1* calls were responded to within 40 minutes (Western Cape Government, 2013). Further adding to the burden, the EMS centre also provides inter-hospital transfers and planned patient transport of which 7 775 were conducted on average per month in the province. These are typically categorized as

[1] Priority 1 and 2 refer to a triage process whereby incidents are categorized according to medical priority. With respect to ambulance triage coding, the following broadly applies in South Africa - Priority 1: patient is unstable and requires immediate attention; Priority 2: patient is stable and requires urgent attention. It should be noted that there is currently no standardized triage system in South Africa (Gottschalk, 2004).

priority 2 calls. Whilst the Western Cape response times are deemed satisfactory it should be noted that these statistics are not an accurate reflection of services provided within the other eight provinces. For example an analysis of perinatal deaths in the Eastern Cape rural district hospital revealed that the most common listed reason (out of eight avoidable factors) was unavailability and delay of ambulance transport (Meents & Boyles, 2010).

Geographical constraints

In addition to increasing demand there are geographical constraints posed by large surface areas. Ambulance crews must cover vast surface areas in the shortest time possible in order to free up scarce resources. Although the EMS centre is situated in the province's capital, it serves the entire province covering approximately 129, 462 km² (Statistics South Africa, 2012a) with a total population estimate for the province of approximately 5.8 million as at mid-year 2011 (Statistics South Africa, 2012b). The Western Cape EMS centre consists of the Cape Town metro district and five rural district municipalities (Eden, Cape Winelands, Central Karoo, Overberg and the West Coast). The smallest surface area is covered by the Cape Town metro district (2 502 km^2) and the largest surface area by the Central Karoo (38 873 km^2).

Language constraints

The language profile of the Western Cape is unique in that approximately 49,7% of the population use Afrikaans as their first language, followed by Xhosa at 24,7% and English 20,2% (Statistics South Africa, 2012c). The remaining 5.4% speak one of the other eight official languages of the country. Thus it becomes significant with respect to any aspect of the health care system in the province that just under half of the population is Afrikaans speaking and just under a quarter Xhosa speaking. No other province has such a high percentage of Afrikaans speaking citizens in relation to the total population.

Emergency dispatch centres – organisational structure

Most industrialised nations of the world have communication centres which deal with public safety issues (Heritage & Clayman, 2010). Countries differ in that some have general versus dedicated emergency dispatch centres or a combination of both. For example America's 911 centre is a general emergency dispatch centre which co-ordinates assistance from police, the fire brigade, traffic or medical services (Larsen, 2013). Denmark's 112 centre is also a general emergency dispatch centre however, alternatively, members of the public have the option to dial a dedicated emergency service directly if

deemed appropriate e.g. police services only. The organizational structure of emergency medical services in the Western Cape is similar to that of Denmark. The Western Cape's 107 is a general emergency dispatch centre from which calls are relayed to dedicated public service providers as deemed necessary. Thus a 107 call taker undertakes the interrogative series to glean information and selects an appropriate emergency service provider. For example, should medical services be required, the 107 call taker dials the Emergency Medical Services centre and relays the information gathered. The 107 call centre was introduced by the government of the Western Cape to provide a one-stop service to the public and prevent time wastage through searching for correct numbers during an emergency (Western Cape Government, 2014). However, alternatively any caller in the Western Cape can dial an ambulance (Emergency Medical Services centre) or any other dedicated service directly.

The two primary activities undertaken by the Emergency Medical Services centre are *call taking* and *dispatching*. Call taking primarily concerns soliciting information necessary for dispatch by using a computer aided dispatch (CAD) system (Heritage & Clayman, 2010). In some call centres the tasks of call taking and dispatching are performed by the same person, however, the Western Cape EMS centre employs both call takers and dispatchers who work in close proximity. Call takers, with the assistance of the CAD system, forward information to dispatchers who in turn dispatch an ambulance to the reported emergency site. Because of the limited amount of time granted to call takers to conduct their activities, dispatch systems have become a vital tool in the emergency service system. The CAD operates via drop down menus. Call takers are required to input dispatch relevant as well as incident related information. The CAD contains unique drop down menus per medical category e.g. the maternity category requires input of pregnancy term length, primigravida or other, district hospital where booked etc.

Recipient design and the 107 and public corpora

It is the aforementioned difference in organizational structure of emergency call centres (general versus dedicated) which presented the primary distinction between the two corpora of data used for this research. The first is the *107 corpus* which is comprised of calls from the Western Cape's general emergency dispatch centre to the dedicated Emergency Medical Services (EMS) dispatch centre. As such the 107 corpus constitutes calls from one emergency call centre to another where the 107 caller acts on behalf of the public caller. The second corpus has been termed the *public corpus* as it constitutes calls received directly from the public to the Emergency Medical Services centre. Broadly speaking the two corpora can be said to represent two different recipient designs.

Sacks, Schegloff, and Jefferson (1974) coined the phrase "recipient design" in a seminal paper on turn taking in conversation analysis. This term is used to refer to the many ways in which participants' design an interaction in consideration of and sensitivity to the other person in the conversation. It speaks of an important ability to individualise a conversation. According to Sacks et al. (1974), recipient design is an analytical phenomenon which provides a basis for variability in conversation as it has been shown to impact a range of conversational phenomena from obligations in opening and closing sequences to turn-taking, lexical choices and various other conversational strategies. As such recipient design provides greater analytical leverage than when such phenomena are concealed under the broad notion of being context sensitive. Thus recipient design is used as a key principle in this paper to differentiate between the 107 and public corpora.

The institutional context of the emergency call

An emergency call is described as a collaborative process with a specialised focus emanating from the institutionalisation of seeking and finding help (Whalen & Zimmerman, 1987). Studying interaction using an institutional framework brings the emergency call, as an institution, to life (Heritage & Clayman, 2010). Institutions tend to display institutional features of talk hence the distinction between ordinary conversation and institutional talk.

Wakin and Zimmerman (1999) explicated the phenomena of truncation or brevity in the openings of emergency calls versus ordinary calls. The opening sequence of the emergency call was shown to be truncated through the use of pre-emption, repositioning and even deletion of important components of what usually occurs in the opening sequence of an ordinary call. Some institutional features of talk, such as truncation discussed above, may be unique to a specific institution because of the type of work that is undertaken whereas other features tend to be common across a variety of institutions irrespective of the work that is being done (Heritage & Clayman, 2010). For example Steensig and Larsen (2008) explored how and for what purposes participants used the words "*you say …*" to formulate questions. This specific type of question formulation can be regarded as an interactional strategy with a variety of possible interactional uses. When this formulation was used as a confirmation-seeking question it was almost always found to be within an institutional context. In these instances it was used by participants when recording information for specific record keeping purposes. Overall, their data showed that a participant's choice out of the whole array of different types of "*you*

say …" questions was directly related to (although not limited to) specific institutional activities. In the same way an emergency call also displays interactional strategies unique to its institutional nature that would not be found in ordinary conversation.

However, the ontological issue which institutional features raise is the risk of the conceptualization of social structures by means of assumption rather than showing specific ways in which such work activities are carried out in a particular setting (Psathas, 1995). Thus a clear understanding of the relationship between the phenomena under investigation and the wider institutional context becomes paramount. These issues have been raised in the form of anti- versus pro-context polarities with many varieties in between. Anti-context proponents purport a form of purism in that only the text itself may be analysed (McHoul, 2008). This is in contrast to pro-context supporters who, to varying degrees, permit the inclusion of certain aspects of context as part of the analysis.

This research espoused a more dynamic view of context as described by Drew and Heritage (1992) and Psathas (1995) in that both the study of talk and the social structure (the institutional nature of the talk) were analyzed. In this view the institutional context becomes imperative as the vehicle through which talk accomplishes social action. Consideration of the social structure of an emergency call potentially furthers an understanding of how participants fulfill tasks during an emergency call interaction (Psathas, 1995). However, in order to avoid the pitfall of assuming institutional phenomena to be pervasive, every attempt was made to explicate competencies as evidenced in the data. This research showed how participants themselves reproduced the institutional structure and as such is analysably defensible. Every effort was made to analyze activities by preserving their *in situ* order and organization as phenomena of study (Psathas, 1995). In order for this to be accomplished the importance of using naturally occurring data came to the fore.

The structure of an emergency call

Using the institutional nature of the emergency call as a basis, Zimmerman (1992) put forward an overall structural organization of an emergency call which comprises the following five phases/sections: opening, request, interrogative series, response and closing. Each phase of the call structure is comprised of a number of sequences and turns within larger sequences. These larger sequences or phases form a type of framework however, it must be borne in mind that the phases/sections are not rigidly fixed, the order may vary and sections may overlap or even re-occur at some point in the

interaction (Heritage & Clayman, 2010). What is of importance is that this type of structuring is a participant resource used by call takers to undertake the organisation's work in a more formal manner using an acknowledged routine (Osvaldsson, Persson-Thunqvist, & Cromdal, 2012). A phase can be regarded as a type of sub-goal to the overarching goal of seeking and finding help (Heritage & Clayman, 2010). The phase entitled the *interrogative series* is comprised of two distinct types of questioning: dispatch relevant and incident related questioning. Dispatch relevant questioning involves gleaning the caller's details and the patient's address whereas incident related questioning relates to the patient's details and medical condition (Larsen, 2013). Of the five phases, research has demonstrated that the interrogative series is the component which requires the most interpretive work on the part of the call taker (Heritage & Clayman, 2010). Thus it is this phase which lends itself to interactional trouble or misunderstandings, potentially compromising intersubjectivity.

Interactional trouble

Literature across a wide variety of institutions from medical to training to organizational contexts has attributed interactional trouble to differing levels of epistemological and other forms of asymmetry (Heritage & Clayman, 2010; Osvaldsson et al., 2012). Epistemological asymmetry is used to describe differences in knowledge and experience between participants in an interaction however, only as pertains to the task at hand (Heritage & Clayman, 2010). For example, to the uninitiated emergency caller (public corpus) there is a host of unknown terminology and activities compared to the more experienced caller (107 corpus) who has knowledge and experience of emergency call terminology and protocol.

Asymmetries are in fact reputed to be so pervasive a part of interaction that interactional practices are said to manifest and embody asymmetries in its various forms (Heritage & Clayman, 2010). In an emergency call asymmetries are usually evident in that the call taker has knowledge of institutional protocols whereas the caller has knowledge of the incident (Osvaldsson et al., 2012). Sidnell (2012) conducted a review of existing literature of epistemic asymmetry in which he noted that participants employ a variety of interactional practices to negotiate differences in knowledge. These practices, which come in many forms, are used by participants to continuously adjust or temper varying degrees of certainty or claims to what is/is not known. For example a speaker who tells, or uses a declarative form, typically claims to have access to relevant information whereas a speaker who asks, claims a gap in

understanding or knowledge. Thus the way that participants manage asymmetries or varying levels of knowledge plays an important role in achieving interactional understanding.

One could also describe this as participants showing a degree of sensitivity to what is regarded as their right to know or say in a given interaction (Raymond & Heritage, 2006). Research conducted by Larsen (2013) showed that a call taker's treatment of information gleaned tended to match the caller's claim of entitlement. Callers who made strong claims of entitlement resulted in the call taker immediately commencing dispatch-relevant questioning whereas weaker claims of entitlement led to incident-related questioning as a form of gatekeeping before proceeding further. Lerner and Kitzinger (2007) purported that speakers' choice of self-reference by means of personal or collective pronouns (I versus we) tended to be guided by both recipient design and considerations of interactional activities which need to be accomplished. It was concluded that participants oriented to potential limits of their own sphere of knowledge with reference to the activity at hand.

In a study which looked at interactional contexts Jefferson and Lee (1981) showed how asymmetries of knowledge pertaining to the institution of help-line calls resulted in competing interactional contexts. For example, a call to a help line contained elements of both a service encounter and troubles telling and participants continuously shifted between the two distinct environments. Troubles telling led to a focus on the person whereas a service encounter focused on the problem at hand. Misalignment would arise if for example the call taker focused on the problem (service encounter) whereas the caller wanted a more personal focus (troubles telling). Because this invariably resulted in interactional difficulties it was described by the authors as a form of contamination due to competing interactional contexts.

Current work in conversation analysis has begun to include a focus on language differences and the potential for interactional trouble. In a study focusing on other-initiated repair in ordinary conversation between Japanese first and second language speakers, Hosoda (2006) showed that for the most part errors in conversation were generally not attended to as a form of interactional trouble. When language discrepancies were attended to it was usually either through a form of a self-initiated request for repair or the use of other-initiated repair in the event of potential misunderstanding. Related specifically to the institution of emergency calls, Osvaldsson, Persson-Thunqvist and Cromdal (2012) undertook a study to explore interactional practices used in a Swedish call centre when the caller was a non-native speaker of Swedish. The main practices identified were firstly, pre-emptive management in the form of checking

and displays of understanding and secondly, the use of conversational repair in the form of repetition of previous turns, using alternative lexical formulations and postponement of potential problems. Postponement was shown to be used as a form of compromise enabling the interaction to move forward rather than tackling the interactional trouble head on. This work was one of the first of its kind to begin to analyze the use of repair as an interactional strategy in the emergency call. The aforementioned paper dealt with interactional trouble resulting from language constraints however, it was considered a worthy analytic endeavor to identify what constraints participants from the Western Cape were orienting to in an emergency call and what strategies were used to manage such.

Interactional strategies - Conversational Repair

Participants within any given interaction have a remarkable ability to employ interactional strategies tailored according to who the audience is and what activities must ultimately be achieved through talk. Thus the type and trajectory of the interaction is contingent on the nature of the relationship between participants and it is this relationship which determines what strategies are relevant or appropriate or not (Schegloff, 1986). In the words of Schegloff (1992) "Intersubjectivity is locally managed, locally adapted and recipient designed" (p. 1338). Of the wide array of strategies which participants use to manage this intersubjectivity, this paper focuses on one particular strategy called conversational repair. Repair is a strategy which participants use to deal with interactional problems that arise in conversation whether it be due to trouble on the speaker's part or the recipient's ability to hear or understand (Lerner & Kitzinger, 2007).

There are two main types of repair, namely; self-initiated and other-initiated. Self-initiated repair, also known as self-correction, is when a speaker has identified some sort of error within his/her own conversation and overtly makes a correction. Other-initiated repair is when a participant identifies the other person's conversation as a trouble source and overtly moves to correct it. Thus the building blocks of repair are identification of a trouble source and subsequent implementation of a strategy (some form of repair) to correct it. Analytically, repair is useful because it usually has an element of accounting associated with it i.e. it is not just about correcting an error but may have been used for an attendant activity such as complaining, forgiving, instructing, displaying knowledge or accusing (Jefferson, 1987). Considerable research has been done on different types of trouble sources in

conversation and forms of repair, however, for ease of reading, detailed information of such have been included together with the explication of specific extracts in *Chapter 4 - Analysis and findings.*

Responsiveness

The use of repair is not a guarantee of successful negotiation as it can either be acquiesced or resisted by the other participant (Atkinson & Heritage, 1984). Thus, when a repair is presented it creates what can be regarded as a repair space (Schegloff et al., 1977). This is an opportunity to more effectively negotiate in order to effectively accomplish the tasks at hand (Sidnell, 2012). The issue becomes whether or not participants are responsive and make use of the interactional space created or not. 'Responsiveness' is thus a term used in this research to describe what Schlegoff (1986) described as interactionally sensitive opportunities such as are created by a repair space.

Participants in an institutional interaction are subject to constraints often due to asymmetries of knowledge and language differences. It is these constraints which necessitate that participants display varying levels of responsiveness and sensitivity based on recipient design (Raymond & Heritage, 2006). Although it is not a new concept in health care, responsiveness has not received any attention in terms of emergency call research. The World Health Organisation (2014) described responsiveness as "the outcome that is achieved when health systems' institutions and institutional relationships are designed in such a way that they take account of and respond appropriately to the universally legitimate expectations of individuals" (Health Systems, para. 3). However, responsiveness can only be determined by analyzing what actually happens when a participant interacts with a particular part of the health system. This research has enabled such an analysis of responsiveness in the domain of communication in the health care system.

Routinisation

However one cannot consider responsiveness without taking into consideration the routines inherent within the emergency call. Routines are at the critical intersection between structure and action (Becker, 2004). 'Routinized protocols' is a term used in this research to describe recurrent patterns of interaction which offer stability to the emergency call as institution (Becker, 2004; Greenhalgh, 2008). The call taker is operating within the constraints of a number of pre-determined guidelines which in many ways serve to structure the call and move it forward as efficiently as possible especially in light of imposed time constraints.

Raymond and Zimmerman (2007) undertook a single case analysis of the interaction between call takers and callers in the 1990 Mountain Glade Fire in the United States of America. This situation was unique in that calls took on a different nature and became information seeking rather than the reporting of an incident or requesting an ambulance. The call centre was inadvertently turned into an information centre in which callers requested updates and advice regarding evacuation and the status of the situation. An interesting observation was how call takers tried to preserve the routinized practices of an emergency call and in fact, both callers and call takers were unable to ignore institutional constraints. Raymond and Zimmerman (2007) argued that this was a possible reflection of how institutionalization leads to opposition to change. Institutional constraints are indicative of a methodical element in an emergency call which tends to play out repeatedly (Heritage & Clayman, 2010). The point of departure for this analysis was thus how these already identified methodical elements of an emergency call actually play out and impact call trajectory.

Chapter 3 – Methodology

Conversation analytic research design

To analyze activities within an interaction is to view research within a constructivist paradigm where the focus shifts from experience to the manifold ways in which talk is used to manufacture experiences, meanings and other social realities (Terre Blanche, Durrheim & Painter, 2006). However, it should be noted that from this broad constructivist foundation two streams of discourse analysis have evolved: ethnomethodological and conversation analytic traditions on the one hand and post-structuralist or Foucauldian traditions on the other (Wetherell, 1998).

This project is a form of discursive analysis which draws from the ethnomethodological and conversation analytic traditions. Although a number of different types of conversation analytic traditions have emerged over the years, currently there are two broad types which share many commonalities but are different in terms of focus (McHoul & Rapley, 2001). The first type (pure conversation analysis) analyses interaction as an entity in its own right whereas the second (applied conversation analysis) explores social institutions (or social structure) in interaction and how these are managed. Both have their merits however, this study used the latter approach by exploring talk and social structure with the premise that interactional phenomena are related to the institution or environment in which they take place (Psathas, 1995).

Purpose of the research

This study aimed to do the following:

1. Explicate conversational repair as a resource used by participants in an emergency call.
2. Delineate the purpose/s for which conversational repair was used i.e. why or for what purpose?
3. Undertake a comparative analysis of the findings from the *107* versus *public* corpora. To explore how knowledge asymmetries were managed and actually played out through the use of conversational repair.
4. Identify whether conversational repair served as facilitator and/or barrier to interaction within and across the data sets

As mentioned previously, this study is unique in that there are two datasets, a *107* and *public* corpora. The logical question that must be clarified is "why not combine the two corpora"? The primary distinguishing feature between the two data sets is the callers' differing levels of epistemological asymmetry. Preliminary investigation of data revealed significant interactional discrepancies between *107* and *public* calls. This afforded the opportunity for detailed explication and subsequent comparison of the two corpora. Thus the aim was to establish what interactional strategies were used, how and for what purposes. Finally, the aim was to then compare the similarities/differences between the two datasets. Later discussion of *dimensions of institutional talk* and *data handling* below provide a clearer indication of the processes adopted and also reflect the more reiterative process followed.

Research questions

Overarching research questions.

How and why is conversational repair employed by participants in an emergency call?

Are there similarities/differences in the use of conversational repair between the 107 and public corpora?

Does this use of conversational repair serve to facilitate or impede interaction in an emergency call?

Questions related to conversational repair.

(Used once the phenomenon of repair emerged as a clear pattern in the data):

- When was repair used?
- When was repair not used?
- How was repair employed (what form did the repair take e.g. self or other-initiated, embedded etc.)?
- What was repair used to accomplish (attendant activities)? i.e. what was its purpose?, what was it used to account for?
- Did the use of repair facilitate or impede understanding?

The data

The research site was the Emergency Medical Services centre of the Department of Health in the Western Cape. The call centre is situated in the Tygerberg Hospital, Bellville, Cape Town. The data set comprised real-life, audio recorded calls downloaded from the computer aided dispatch system of the call centre. Calls were recorded over a four year period between 2010 and 2013. Approximately 101

calls were made available to the Health Communication Research Unit of the University of the Witwatersrand for research purposes within the confines of a signed confidentiality agreement. Table 1 below provides a breakdown of the data set used for this research.

Table 1 Summary of the number and category type of calls analyzed per subset (107 versus public corpus)

107 VERSUS PUBLIC CALLS PER MEDICAL CATEGORIES			
Category type	Subsets/Recipient design		
	107	PUBLIC	TOTAL
Trauma	13	20	33
Teenage Pregnancy	17	11	28
Maternity	14	12	26
Sexual Assault	4	3	7
Patient unresponsive	5	2	7
TOTAL	**53**	**48**	**101**

As can be seen from the above table, the data set had a fairly even split between 107 calls (n = 53) and public calls (n = 48). The total data set translated into approximately five and a half hours of uninterrupted listening time. This provided a sufficiently large data set to explore and compare patterns of phenomena across the two datasets. Approximately twenty call extracts were transcribed using the Jeffersonian transcription notation system (Jefferson, 2004) of which ten appear in this paper. Extracts were selected based on their ability to serve as exemplars of regularity/irregularity of selected phenomena (Mazeland, 2006). A key to all extracts used in this paper appears in Table 2 below.

Table 2 Extracts used in this research paper

Ex-tract	Title	Category	Recipient Design	Call Reference Number	Call duration (minutes and seconds)
1	*The epitome of efficiency*	Teenage Pregnancy	107	201212261055	1:24
2	*Tell me, is that the ambulance services?*	Sexual Assault	Public	2013010110402	3:05
3	*The all-important classification*	Teenage Pregnancy	107	201212271031	1:45 *
4	*First things first*	Trauma	107	17 April 2011 101010	2:00
5	*Don't you need her name?*	Trauma	Public	18 Oct 2010 12h42 IR10486	2:49
6	*You have been sanctioned*	Sexual Assault	Public	2013010110402	3:05
7	*Language switching as responsiveness*	Maternity	Public	2012122610198	2:00
8	*Language switching for routine purposes*	Patient Unresponsive	Public	20121228101149	1:13
9	*Ah, now I understand – the water filtration plant*	Trauma	Public	25 Feb 2011 IR 10154	4:25
10	*The call taker's dilemma*	Patient Unresponsive	107	2012123110438	14:00

*In 107 calls, the call duration excludes time taken should the call taker opt to speak to the public caller in addition to the 107 caller.

A more thorough explanation of how the data was managed is included in the section on *Data Handling.*

Dimensions of institutional talk

Because an emergency call stems from the institutionalisation of seeking and finding help (Whalen & Zimmerman, 1987) it was deemed fit to use the dimensions of institutional talk as an analytical framework for the data. Drew and Heritage (1992) outlined six dimensions of institutional talk which are in essence different levels of organization of the interaction. The dimensions are: overall structure/phases, the turn-taking system, sequencing, turn design, lexical choice and forms of asymmetry (Heritage & Clayman, 2010). Although the dimensions are listed separately they are all inextricably linked. These dimensions assisted in providing a more systematic approach to the analysis whilst retaining a fine level of granularity which had important implications for the trustworthiness of the findings. A brief overview of the dimensions follows:

Overall structure.

The five phases forming the emergency call structure were outlined in the literature review in the section *The structure of an emergency call*. The methodological usefulness of call structure is that it

allows for analysis of the phases/sections of work within an emergency call (Atkinson & Heritage, 1984). Within this study an overall call structure was explored for the *107* and *public* corpora separately. This allowed for an analysis of significant phases within these unique data sets and more importantly, phase progression (Heritage & Clayman, 2010).

Turn-taking organization.

Because conversation is played out turn for turn an important notion in a conversation analytic approach is the sequential organisation of the interaction (Heritage & Clayman, 2010). Sequential turns are both context-shaped (a turn is influenced by what was said/done before) and context-renewing (a previous turn influences what is deemed relevant to be said/done next), (Sacks, 1987). This analytic stance enabled observation and explication of whether the previously spoken words were understood correctly in context (Atkinson & Heritage, 1984).

However, turn-taking systems tend to vary from institution to institution and an emergency call involves a special turn-taking system which is more systematic than would be found in ordinary conversation (Heritage & Clayman, 2010). It is a transformation of the turn-taking system of more ordinary conversation (Sacks et al., 1974). An emergency call has a disparate distribution of questions and answers largely due to the questioning protocols derived from the EMS computer aided dispatch system. Further to this, the questions usually unfold in a specific sequence. This tends to limit the scope of the interaction, changing and shifting participants' opportunities for action (McHoul & Rapley, 2001). It also changes how participants interpret activities within the turn-taking system. Because such a specialized turn-taking system influences the very structure of activities and interactional opportunities, an analysis which includes the institutional context becomes imperative.

Sequence organization (including repair).

Sequence organization is not analytically possible without considering the concomitant turn design (discussed above). Turn design comprises firstly *what* the turn is designed to do (some action) and secondly *how* (by what means) this is done (Drew & Heritage, 1992). In other words a participant must select the action to be carried out through the turn and then choose what strategy to accomplish this with (Heritage & Clayman, 2010). Previously it was mentioned that preliminary analysis of the data led to the exploration of the organization of *repair* in the data sets. Repair is a useful analytic phenomenon because it characterizes the turn-taking system (Schegloff et al., 1977) and shows what a participant is orienting to within the interaction (Lerner & Kitzinger, 2007). As constitutive of the turn-taking system it follows that repair is a sequential phenomenon which has two main elements comprising the initiation

thereof and the subsequent outcome (Schegloff et al., 1997). Repair is thus structured and the different elements can be systematically identified and explicated. The analysis of repair formed a crucial part of this study because it enabled the researcher to explicate display of understanding as well as misunderstanding (Schegloff, 1992).

Lexical choice, epistemological asymmetry and recipient design.

Lexical choice and epistemological asymmetry are pervasive throughout all the aforementioned dimensions of the organization of talk. Lexical choice refers to the significance of specific word selection and more importantly what those words are employed to do (Heritage & Clayman, 2010). With regards to epistemological asymmetry a definition and explanation was provided under "*Interactional trouble*" in the literature review. These dimensions resulted in an evolving question design (data driven) rather than being decided upon *a priori*.

Data handling

Broadly speaking, the approach adopted for data handling purposes can be divided into three phases namely: a search for regularity, deviant case analysis and integration of findings with theory.

Phase 1 – Search for regularity

For the purposes of this study, all calls were initially reviewed aurally (approximately twice each). This phase involved looking for regularly occurring patterns or systematic features through extensive listening (Heritage, 1988). Because of the large data set each call was assigned a researcher's code for easy retrieval. An excel spreadsheet was then used to categorize calls according to this code as well as the original soundwave file name, recipient design type (107/public) and notes on any initial observations. The use of a spreadsheet enabled the researcher to determine the fairly even split of the number of calls between the 107 versus public data sets. Based on prior literature as well as emergent phenomena unique to this particular data set, a rather broad spectrum of initial observations was noted in the spreadsheet. The questions below served to guide this stage of the process.

Questions related to the overall call structure (used to help identify patterns).

- What phases/sections of activity can be identified in an emergency call (using Zimmerman (1992) as a benchmark)?
- Are any phases/stages significant? Particularly with respect to: request and response sequences and the incremental progression of the phase/section e.g. did certain phases reveal more interactional trouble or smoothness? (Heritage & Clayman, 2010).

- What strategies did participants use to construct their own behaviour and to understand (make sense of) and manage that of the other? (Atkinson & Heritage, 1984).

These questions or prompts enabled initial observations which ranged from strategies used by participants to lexical choices to interactional smoothness or difficulties within each individual call. Once initial observations were recorded a data map was used to facilitate a systematic process. The data map comprised the following:

A template for overall call structure – the template based on the work of Zimmerman (1992) was used to map similarities and differences between the template call structure and that of the 107 and public corpora respectively. Thus each call was aurally reviewed again in order to establish an emerging structure. Once call structures were obtained for each data set (107 and public) these overall call structures were compared to one another and similarities and differences were explored. Call structure proved to be an important addition to the analysis because it uncovered differing levels of interactional smoothness/trouble in different phases of an emergency call for the *107* versus *public* corpora. Further searching showed that these differences were largely attributable to the differential use of pre-emptive strategies and conversational repair in the two datasets.

Further guiding questions – a set of guiding questions related to the what, how and why of pre-emptive strategies and conversational repair were then applied to all calls which were reviewed again aurally. The guiding questions provided a focus in the search for regularities with respect to the identified phenomenon of repair in particular. The researcher thus attempted to explicate the regularity, orderliness and structure of repair as well as for what purposes it was used (Heritage, 1988).The analytic process was more reiterative than linear and as such Phases 1 and 2 were conducted simultaneously rather than consecutively.

Phase 2 – Deviant case analysis.

Phase 1 enabled the researcher to assemble collections of instances in which repair and pre-emption were used (Heritage, 1988). Each call was used to broaden and redefine patterns as identified within a given collection. However, a useful supplement to the search for regularities was a search for those cases which deviated from the norm. Deviant case analysis forms an important part of any analysis in which regularly occurring patterns are identified because it shows where, how and why participants departed from the commonly used strategies and patterns identified. Ten Have (2007) purports that the inclusion of deviant cases allows an added dimension to analysis. Thus this research included an added dimension that explored possible wider patterns in which the interactional strategies were used to

achieve specific purposes/activities (Maynard & Heritage, 2005). In other words it was a search for the logic behind participants' actions. This afforded an element of rigour to the analysis.

At this point extracts were chosen based on their ability to serve as exemplars for the collections identified across the two data sets. It is acknowledged that phenomena identified in this data set were highly prevalent and as such any number of call extracts could have served as exemplars. The collections were as follows:

Collection 1 – Self initiated repair and pre-emptive strategies by 107 callers

Collection 2 – Other-initiated repair by public callers

Collection 3 – Other initiation of repair

Collection 4 – Embedded repair used by public callers, 107 callers and call takers

As will be evidenced in some of the extracts chosen, many calls in the data set contained Afrikaans data. This data was translated by a professional translator to preserve data integrity.

In addition to the aforementioned four collections, exemplars were also chosen to represent the two primary activities identified in the study, namely: orientation to routinisation and responsiveness. The deviant cases were particularly useful for analytic purposes in that they reflected either a complete departure from typical patterns found in the data set or a more extreme version of that found. It should be reiterated that although a spreadsheet, data map and transcription of extracts were used for data management purposes, the raw data remained the primary source of data used (Atkinson & Heritage, 1984).

Phase 3 – Integration of findings with theory.

This phase involved the theoretical integration of findings with the existing body of knowledge (Heritage, 1988). The trustworthiness and rigour of analysis using a conversation analytic approach relies on the resourceful use of existing conversation analytic research (Schegloff, 1992). Thus this analysis was not reliant on a prescriptive methodology but the researcher was able to draw upon large bodies of knowledge. The availability of such knowledge is due to the frequency of commonly occurring social phenomena. This speaks to Schegloff's (1992) notion of the orderliness of social interaction. For example, in this paper research concerning the types and uses of repair was used to explicate extracts in a fine level of detail which would otherwise not have been possible. Another way in which existing conversation analytic research was resourcefully used was by drawing upon the identified dimensions of institutional talk.

Ethics

The parties identified as potentially interested in or affected by this research are (Mason, 1996): The University of the Witwatersrand and the Western Cape Emergency Medical Services Centre. The university has a code of ethical practice which requires ethical clearance for projects of this nature. As mentioned previously, full ethical clearance for this project was obtained by the Health Communication Research Unit. The ethical clearance number is M110301 obtained on the 25th of March 2011 and is valid for a period of five years (see appendix A).

The following issues were also taken into consideration:

Rights of privacy - this data is of a sensitive nature and therefore no participants' names have been used. This pertains to call takers and callers. Names of all participating individuals were changed to pseudonyms during the transcription process and to this effect anonymity, not confidentiality, can be offered. Further to this, all potentially identifying geographical locations (e.g. street names and numbers) have been changed.

Data protection legislation - the raw data in audio format jeopardises both anonymity and confidentiality of participants. For this reason the audio recordings were not disseminated or shared without the express prior permission of the Chairman of the Health Communication Research Unit. On completion of the project, the researcher's copy of the audio recordings was destroyed. The original recordings remain within the jurisdiction of the aforementioned research unit. Data was not loaded onto the researcher's personal computer but was recorded on a data stick and stored in a safe when not in use.

Trustworthiness of the data

A primacy concern around qualitative data analysis is the production of analytically defensible conclusions. Without some form of controls there would be no limitations imposed on human tendencies such as fading memory, inaccurate recollections and intuitive idealizations (Atkinson & Heritage, 1984). However, in conversation analysis, the insistence of the use of recordings and a more systematic approach is advantageous with respect to the trustworthiness of the data in the following ways:

Naturally occurring text.

Because the data was not occasioned by the researcher or specifically produced for analytical purposes it is regarded, in a broad sense, as naturally occurring. This enabled the reduction of unnecessary levels of abstraction through the use of interviews, focus groups and other more traditional qualitative scientific methods (Heritage, 1988). Levels of abstraction can result in the dependability and range of the data being called into question however, this research made use of a relatively large body of data (101 calls) which was systematically compared in its own right.

Audio recordings.

Because the analysis was based on voice recordings the material was repeatedly reviewed in fine detail (Heritage, 1988). This helped to overcome possible limitations of memory and natural propensities towards idealisations (Atkinson & Heritage, 1984). Further to this, the data set can still be made available in raw form for public scrutiny of findings as well as reanalysis as it has not been imposed upon by a specific research design.

Systematic approach with a fine level of granularity.

Conversation analysis prizes a systematic form of analysis in which no detail can *a priori* be discounted (Atkinson & Heritage, 1984). Using a fine level of granularity for analytical purposes allowed important, previously unnoticed, phenomena to become observable and facilitated a more adequate and defensible account thereof (Schegloff, 2000). This also further limited the potential to formulate idealized versions and enabled an investigation of a structured pattern which became evident in the data (Psathas, 1995).

Reflexivity in conversation analysis.

Because conversation analysis is a systematic form of analysis which involves the choice to focus on fine details, Schegloff (2000) purports that issues of granularity become issues of reflexivity and therefore serve an important methodological function. In other words, granularity also pertains to the researcher (not just the text) in that choices are made regarding the selection of varying levels of observation. This potentially influences whether a phenomenon is discovered or not and further to this it influences the defensibility of the analytical account. Thus a chosen level of granularity can also be said to become a feature of one's own enquiry. For the purpose of this research a number of dimensions of institutional talk were used as a framework which enabled a more thorough analysis incorporating the different layers of the structural organization of talk within an institution (Heritage & Clayman, 2010).

Retention of context through the use of action sequences.

An important element of this research was a focus on the organization of the talk in the interaction i.e. the turn-by-turn sequences of action. This facilitated an analysis of the ways in which different contexts were renewed *in situ* (Heritage & Clayman, 2010). Without an analysis of turn design the data could have become decontextualized and the understandings and orientations of the participants themselves could have been missed or misunderstood (Atkinson & Heritage, 1984).

The use of a transcription system.

The use of a transcription system such as the Jeffersonian system (see Appendix B) used in this study helps to preserve the sequential features of the interaction as well as small details (Jefferson, 2004). There are a number of transcription systems available however, the Jeffersonian system is highly detailed and describes features of talk to assist in the analysis of the organization of talk (Psathas, 1995). However, it is acknowledged that transcription is a subjective process in that a co-constructed version of the data is produced. Ten Have (1999) describes this as a "kind of mediation between the raw data, the recordings, and the to-be-constructed images" (p.28). However, conversation analysts do not purport that a transcript replaces the raw data but rather should be used in conjunction with the recording (Atkinson & Heritage, 1984). For this research the database thus comprised primarily the audio recordings and only a few selected extracts were transcribed to serve as exemplars of identified phenomena.

Additional benefit - the supervision process.

This project was one of several emergency call projects falling under the auspices of the Health Communication Research Unit. To this end there was an added advantage of monthly group meetings which facilitated group data analysis sessions, peer debriefs and supervisor input. These processes together with the addition of deviant case analysis allowed for an element of rigour that would otherwise not have been possible.

Chapter 4 – Analysis and findings

Call structure (Sectional Analysis)

The overall structure of 107 and public calls were analyzed to establish the different phases of activity. Each phase comprises a grouping of sequential turns (Heritage & Clayman, 2010). This sectional analysis did not serve to explicate minutiae but rather provided a broader overview of the progression of a call. Extract 1 serves as an exemplar of call structure for a 107 call whereas Extract 2 is an exemplar representing the public data set. The different phases that were identified, as benchmarked against those outlined by Zimmerman (1992), are marked in italics.

Overall structure of 107 calls.

Extract 1 (201212261055); 107 caller – *'The epitome of efficiency'*

(CT = call taker; 107 = 107 caller)

1	CT	Emergency Services, Busi* speaking
2	107	Busi, Stephanie* 107, maternity ← Note: Altered request format
	→	*End of phase 1 (opening) and 2 (request)*
3	CT	Phone number?
4	107	Telephone number will be 0-7-3
5	CT	Ya
6	107	6-3-8
7	CT	Yes
8	107	9-9-1-6
9	CT	[Caller's name]
10	107	[Josephina]
11	CT	(5.0) Address
12	107	.Hhh 95 Happy street
13	CT	(3.0) Which area?
14	107	That is in Wesbank, close to Blom Street ↓ Note: pre-emptive
15	CT	(7.0)Her name please? incident description
16	107	Ja, um: ladies name is Duduzi, she is 15 years of age, first
17		pregnancy, hhh term, water broke, booked for Delft
	→	*End of phase 3 (interrogative series – comprised of dispatch relevant and incident related questioning)*
18	CT	(27.0)1055 ← Note: altered response format
19	107	1055? Want to speak to the caller?
20	CT	No its fine
	→	*End of phase 4 (response)*
21	107	Thank you, ['kay, bye]
22	CT	[Bye]
	→	*End of phase 5 (closing)*

*Pseudonyms have been used throughout this document

Extract 1 above can be regarded as an exemplar of a 107 call structure for the following reasons:

1. Opening phase (lines 1 and 2). In lines 1 and 2 the participants open up the interaction and establish institutional identities (Emergency Services and 107 emergency call centre).
2. Request phase (line 2) - The request and response sequences are of particular significance in an emergency call because this is regarded as the core business of the institution (Heritage & Clayman, 2010). A traditional request formulation would be a direct request for an ambulance ("Can I/we … have/get an ambulance") (Heritage & Clayman, 2010). However, the 107 caller announces the reason for the call with the lexical choice "maternity". In the vast majority of cases within the 107 corpus the lexical choice is "I have a medical/maternity for you". There were few instances of a 107 caller using a traditional request format in the 107 data set. An existing body of research has explored the various structures of request formats used by members of the public (imperative, interrogative and declarative), and the associated differing claims to entitlement (Larsen, 2013). Although even the most obscure form of request is recognized by the call taker as a request, the structure of a request is used for specific purposes. In other words it is used as a participant resource to perform certain actions. In 107 calls the structure of the request is strongly grounded in pronominal choices. In conversation, pronouns (he, she, you, we, they) are used by participants to fulfil significant interactional tasks (Lerner & Kitzinger, 2007). In the 107 corpus it is proposed that the caller uses the pronouns "I" and "you" to differentiate roles and concomitant tasks and accountabilities. The 107 caller and the call taker are both participants from the institutions of emergency operating call centres and have a shared role in gleaning vital information from the public, however, it is the call taker's role and accountability to co-ordinate ambulance dispatch. Therefore pronominal choices give a sense of discharging accountability from oneself to the other party. This shows the agentive nature of social interaction in which people tend to hold one another accountable on different levels (Heritage, 1988). A pattern of self-initiated repair was identified as a frequently occurring phenomenon, however, this will be further explored later in this paper.
3. Interrogative series (lines 3 – 17). In line 3 the call taker begins the interrogative series by asking for the caller's phone number. Of note is the absence of traditional gatekeeping activities as documented in the emergency call literature whereby incoming calls are screened to establish whether ambulance services are warranted or not (Heritage & Clayman, 2010). The absence of this phenomenon is thus highly informative. However this was a significant omission across the 107 data set. It is suggested that because the 107 caller has already provided a first screening, a call taker may deem such gatekeeping as having already been undertaken. This speaks to the more symmetrical nature of the relationship between call taker and 107 caller in which hierarchical

positions are invoked as categorical features of institutional identities and roles (Psathas, 1995). Also of note in the interrogative phase is the use of pre-emptive strategies by the 107 caller whereby she initiates further topics (Schegloff, 1986). In line 15 the call taker asks only for the patient's name, however in lines 16 and 17 the 107 caller proceeds not only to provide the name but additional incident related information regarding the patient's medical condition. Pre-emption is commonplace in the 107 corpora. This is significant as it reduces the number of turns within the interrogative phase resulting in shorter, trouble-free sequences (Schegloff, 1986).

4. Response phase (lines 18 – 20). The long silence in line 18 culminates in the issuing of a reference number. No accompanying words such as "your reference number is …" were deemed necessary by the call taker. Line 18 thus represents a matching sequence to the request presented earlier in the interaction. It represents a more truncated approach. Acceptance and common understanding of this procedure is evidenced by the 107 caller's immediate uptake. Also the call taker does not query the lengthy silence presumably because of this common knowledge of the process at hand. As a standard procedure the 107 caller gives the call taker the option to speak directly to the caller (line 19). For the most part, in this data set, call takers declined the invitation, however, in cases where the call taker opted to speak to the caller, the call had a similar trajectory to a public call and thus was not explored further within the 107 corpus.
5. Closing phase (lines 21 and 22). A co-ordinated ending of the interaction.

Of particular import, this sectional analysis has shown the more truncated, altered request-response format as well as a reduction of turns in the interrogative series which is indicative of interactional smoothness.

Structure of public calls.

Extract 2 below is an exemplar of a call structure from the public corpus. In this extract a police sergeant from a local police station calls to request an ambulance on behalf of a rape victim. It could be argued that a sergeant from a police department does not constitute an ordinary member of the public. However, from an applied conversation analytic perspective the focus of this study is participant knowledge (epistemological asymmetry) with respect to the institution of the emergency call and associated protocols, irrespective of knowledge of other institutions. The police sergeant displayed asymmetries of knowledge in that he did not seem to be familiar with the call format and protocols. This is especially so in contrast to the 107 caller.

Extract 2 (2013010110402); public caller – *'Tell me, is that the ambulance services?'*

(CT = call taker; Pol = police department)

1	CT	Emergency medical services, Debbie speaking
2	Pol	Hi:: good morning. You speaking to Sergeant Hanekom from the
3		railway police. Tell me is that the ambulance services?
4	CT	Ye:s
	→	*End of phase 1 (opening)*
5	Pol	.hhh yes ma'am, tell me we, um,need an ambulance man, .hhh um: a
6		lady was being raped there at Stellenbosch railway station
	→	*End of phase 2 (request)*
7	CT	(9.0)(…..) to whom I speaking to?
8	Pol	Hanekom
9	CT	(8.0)Spel vir my
10	Pol	Come again?
11	CT	Can you spell it for me?
		Okay its ((name is carefully spelt out))
12	CT	Your contact number there please Sergeant
13	Pol	0-2-1
14	CT	Yes
15	Pol	449
16	CT	Yes
17	Pol	5111 .hhh. Okay:: to whom I speaking to?
18	CT	Debbie, sergeant
19	Pol	Debbie who?
20	CT	Debbie
21	Pol	Debbie?
22	CT	Yes
23	Pol	Can I have a number there Debbie? I mean a reference number
24		Sorry
25	CT	I'll give you one now once I take all the detail and where,
26		where's this taking place?
27	Pol	At Stellenbosch railway station
28	CT	((CT becomes occupied with the system and caller is having
		conversation in background whilst waiting(22.0)))
29	CT	Sorry hey I'm just busy::
30	Pol	Okay
31	CT	(15.0)Where close to where on the railway um station can we find
32	Pol	her sergeant?
33		a-come again?
34	CT	(…) where will we find her?
35	Pol	Okay, she will be there by the ticket office. .hhh you can just
36		Complain there's um:: a Ms a-Swart
37	CT	Working at ticket office (….) hey?
38	Pol	At Stellenbos the ticket office yes
39	CT	(.)a:: (.) how old is the female? (1.25) Sergeant?
40	Pol	Hello?
41	CT	How old is the female?
42	Pol	Okay, hold on for me (8.0)
43		((The sergeant consults a third party in the room with him))
44		30 years old
45	CT	30
46	Pol	Yes ma'am
47	CT	Right, name and surname?
48	Pol	No man, she's very hysterical (…)[you can't,]
49	CT	[okay,I'm putting unknown hey?]

```
50   Pol                                        [difficult for her
51           to talk to us]
52   Pol     Yes, just make it unknown. (……..) to [talk to her] now mmmm
53   CT                                          [raped and]
54           and assaulted?
55   Pol     a- not actually but yes you can take it assaulted ya
56   CT      I'm just gonna write and assaulted hey?
57   Pol     Ya,ya.
     →       End of phase 3 (interrogative series)
58   CT      Okay officer, a:: so I think your reference number is 1042
59   Pol     1-0?
60   CT      4-2
61   Pol     4-2, thanks Debbie
     →       End of phase 4 (response)
62   CT      Okay
63   Pol     'kay, bye
     →       End of phase 5 (response)
```

1. Opening phase (lines 1-4). The opening serves to open up the interaction and establish identities.
2. Request phase (lines 5 and 6). The request follows a more traditional format "we, um, need an ambulance …". In this extract the caller stated the incident type, a rape, upfront. However, usually if a caller requests an ambulance without such justification the call taker assumes a gatekeeping role in the next turn. This gatekeeping role is common in the public corpus. The re-emergence of this role in the public corpus is significant considering its absence in the 107 corpus. This is evidence of interactional tailoring based on recipient design (Schegloff, 1986; Lerner & Kitzinger, 2012).
3. Interrogative series (lines 7 – 57). The protracted interrogative series of a public call is in stark contrast to the streamlined 107 calls. This is indicative of greater interactional difficulty. Schegloff (1987) identified that the most common misunderstandings are related to sequencing (appropriate use of next turn) and references (to person/place). This is evident in the public calls as evidenced by the frequent use of repair, and in particular other-initiated repair.
4. Response phase (lines 58-61). As mentioned previously, a request and a response usually take on similar forms even though they do not appear sequentially. In the public corpus the caller directly requests an ambulance (can I/we have; we need) and the call taker usually responds with "we are/will sending/send an ambulance. In Extract 2 the request-response sequence do not necessarily form a matching pair. However, the caller's premature request for a reference number (line 23) may possibly have resulted in the differing format of the response in this particular instance.

5. Closing phase (lines 62 and 63). Participants then co-ordinate the end of the interaction.

The sectional analysis of the public corpus has shown a return to a somewhat more traditional request-response format as well as an elaboration of the interrogative series which is indicative of greater interactional difficulties resulting in both participants undertaking substantial work.

Summary of call structures.

Table 3 Overall structure of emergency calls as per Zimmerman (1992), 107 calls and public calls

(Zimmerman, 1992):	Corpora 1: 107 calls	Corpora 2: Public calls
Opening	Opening	Opening
Request (Can I/we …)	Altered request format - declarative statement: "I have a medical for you" "I have a maternity for you"	More traditional request format: "I/we need an ambulance"
Interrogative series	Interrogative series – streamlined, questions often pre-empted by 107 caller, self-initiated repair by 107 caller	Interrogative series – lengthy, laboured, frequent use of other-initiated repair
Response	Altered response format – the response matches the request. No mention of ambulance dispatch - reference number serves as response equivalent.	More traditional response formats used: "we will send an ambulance for you" Sometimes caller pursues clarity of response "when is the ambulance coming?"
Closing	Closing	Closing

Note: The phases/sections as identified by Zimmerman (1992) are used as a baseline structure for 107 and public calls

In summary, as depicted in Table 3 above, the structure of the calls in both corpora essentially follow a similar structure with similar phases to that documented by Zimmerman (1992). However, there is some variance with regard to the nature of some of the phases. This was to be expected as the structure presented by Zimmerman (1992) was designed with respect to unique recipient designs and concomitant actions (Schegloff, 1986). Thus the template used was regarded as a type of skeleton structure which has inevitably been fleshed out and modified for this dataset by considerations such as

recipient design and action formation as demonstrated above. Progression through the phases of a 107 call appeared smoother being characterized by self-correction (request/response phase) and pre-emptive strategies (interrogative phase). The progression of a public call displayed more interactional difficulties and was characterised by frequent use of other-initiated repair (interrogative phase). For this reason the phases of the overall structure of the 107 and public calls identified above are at once similar (same phases/sections) however, have unique characteristics.

Overall call structure as interactional resource used by participants.

The differences in the nature of certain phases of an emergency call demonstrated that participants tailor interactions on an ongoing basis.

An analysis of call structure facilitated identification of the following patterns:

- An altered request-response format in a 107 call
- Interactional smoothness in the interrogative series in a 107 call
- Interactional difficulties in the interrogative series in public calls.

Interactional smoothness and difficulties were related to the following interactional phenomena:

- 107 data set - self-initiated repair and pre-emptive strategies
- Public data set - other-initiated repair

Data was thus further analyzed with a specific focus on conversational repair.

Collections of conversational repair

Repair was investigated across both the 107 and public corpora. All instances of repair were investigated irrespective of the type of repair used (self-initiated, other-initiated or embedded). Repair was also explored irrespective of who initiated the repair (107 caller, member of the public, call taker). Because of the highly collaborative nature of an emergency call, it is inevitable that the call taker is both the initiator of repair and responsive to it (Atkinson & Heritage, 1984; Schegloff, 1980).

Collection 1 - Self-initiated repair by 107 callers

Seminal work on the use of repair in interaction purports that participants show a preference for self-repair rather than other-initiated repair (Schegloff et al., 1977). Further to this, most self-initiated repair occurs within the same turn-constructional unit as the trouble source i.e. the speaker introduces the repair and the solution within the same turn as the trouble source (Lerner & Kitzinger, 2007). Extract 3

is an instance of same-turn replacement repair within the same turn-constructional unit as the trouble source

Extract 3 (201212271031); 107 caller – '*The all-important classification'*

Self-initiated repair (type of trouble source: word-replacement (Schegloff et al., 1977))

(CT = call taker; 107 = 107 caller)

```
1    CT       (…….) good day
2    107      Lizzie, Karen from 107 I have a medical incident for you,
3    →        sorry, it's a maternity.
4    CT       Okay, let's start with the address, how old is she?
```

In Extract 3 the speaker formulated the word "medical" and subsequently apologized and withdrew the word and replaced it "maternity". Usually a word is replaced by a synonym or antonym (Lerner & Kitzinger, 2007), however, in this instance a category "medical" is replaced by another category "maternity". The fact that the speaker replaced the original term with another is indicative of the fact that the original word was deemed incorrect and so became a trouble source. The new term was considered more suitable to the task at hand and thus posited as a repair solution. The use of the word "sorry" (line 3) is evidence of a strong initiator (Schegloff et al., 1977). Put another way, the 107 caller demonstrates a keen awareness of using an incorrect classification. Extract 3 thus shows a clear instance of word replacement. Although also a self-initiated repair within the same turn-constructional unit as the trouble source, Extract 4 below is unique in that it is not a word replacement, nor is it a repair on person-reference nor a repair on next-speaker selection, rather it is a repair on procedural selection.

Extract 4 (17 April 2011 101010); 107 caller - '*First things first*'

Self-initiated repair (type of trouble source – repair on procedural selection)

(CT = call taker; 107 = 107 caller)

```
1    CT    Emergency Services, Busiswe speaking, good evening?
2    107   Good na-a-evening Busiswe, Gloria 107 I've got a:: medical for
3          you?
4    CT    Yes,Gloria
5    107   Um: This person fell off his bike and now:: his head is very,
6    →     (.)okay but I'll give you the person's number 021-
7    CT    Yes
```

In Extract 4 the speaker proceeds to describe the incident (line 5) but then interjects with a pause and the word “okay” and in so doing induces a transition space so as to introduce a new topic, “but I’ll give you the person’s number”. A transition place is that space when a speaker comes to the end of a logical speaking unit, usually a sentence and a turn transition then takes place so that the other participant can take up the conversation (Sacks et al., 1974). However, in a repair sequence it is not uncommon for the initiator to end a sentence and then take up the transition space him/herself in order to execute the repair (Schegloff et al., 1977). However, what is significant in Extract 4 is that the speaker stops mid-sentence and artificially induces a transition space in order to switch the topic. Such an abrupt change of topic implicates that there are a number of sequential environments at play. There is the sequential environment of the interaction in its own right as well as some other sequential protocol which in this instance supersedes. It is the protocol that dictates an order of preference in which topics should be raised.

Repair as interactional resource used by 107 callers.

The matter which now requires addressing is “what is repair being used to accomplish interactionally in the above instances?” Word replacement and repair on next procedural selection are not simply used to correct errors (Lerner & Kitzinger, 2007). In fact, to the casual listener, uninitiated in emergency call protocols, the above “errors” would possibly not have been regarded as obvious errors. The fact that the speaker repairs a trouble thus provides an indication for analytical purposes that something is unusual or amiss. The conversation analytic axiom of, why that choice and use of repair right now, comes to the fore (Heritage & Clayman, 2010) i.e. what about repair took precedence over the continuation of that specific turn of the interaction? (Lerner & Kitzinger, 2007).

As a point of departure to these questions, consider the notion that self-correction and self-correctors are seen by others as having acquired a certain level of competence (Schegloff et al., 1977). It is precisely this competence which the participants in the above extracts are showing to one another. In Extract 2 (word replacement) perhaps the caller is actually orienting to the fact that the call taker is using drop down menus on a computer aided system and accurate classification will enable quicker access to the maternity drop down menu and concomitant incident related questions unique to maternity. Whilst this is a feasible explanation, it cannot be evidenced in the data. However, a clear orientation to specific protocols does seem evident. Both participants orient to the known routine. The word replacement in Extract 2 serves to implement the correct protocol and so facilitate a smooth interactional shift to the next sequence of the business at hand. In Extract 3 (procedural selection) the

107 caller is demonstrating competence and knowledge of the fact that a call taker usually first gleans dispatch relevant information (caller's number, name and address) and then only moves to incident related information (patient's details and condition) (Larsen, 2013). The call taker's "yes" (line 7) acknowledges the shift and shows a mutual re-alignment to protocol.

These particular instances of repair are evidence of the entrenchment of the pre-allocation of the turn-taking system within an emergency call (Heritage & Clayman, 2010). Pre-emption as a strategy is evidence that participants are tailoring the interaction to the many idiosyncratic features of the particular circumstance (Schegloff, 1986). In the 107 data set pre-emption was used to steer topical direction by forward feeding dispatch and incident related information prior to the call takers prompts. The call taker participated and allowed the accomplishment of the caller's strategy thus allowing the interaction to move forward smoothly (Atkinson & Heritage, 1984).

Collection 2 – Other-initiated repair by public callers

In Extract 5 below, the call taker has completed the interrogative series in which dispatch relevant and incident related information were gleaned and she now proceeds to move to the response and closing phases of the call. Thus the initial request phase is finally met with a matching response that an ambulance will be dispatched (line 10). From this point of departure the caller, as recipient of the given response, would typically produce a sequentially appropriate next turn e.g. the response sequence would be brought to completion with the onset of the closing through the exchange of "thank-you" and "good-bye" (Heritage & Clayman, 2010). However, this caller does not provide a sequentially appropriate next turn. In line 11 she introduces a repair using a two-fold question format which changes the trajectory of the call.

Extract 5 (18 Oct 2010 12h42 IR10486); public caller - '*Mustn't you take her name?*'

Other-initiated repair

(CT = call taker; PC = public caller)

Note: this extract has been translated. Translated items have been styled in a bold font

```
10  CT  O::kay mevrou, ons stuur 'n ambulaans daar vir haar hoor↑
        O::kay misses we send an ambulance there for her, hear↑
11  PC  Okay, met wie praat ek nou?
        Okay, who am I speaking to now?
12      ((Call taker proceeds to give her name))
13  PC  Moet julle nie haar naam vat nie?
        Musn't you take her name?
14  CT  Um::, nie eintlik nie, ons gaan straight, hulle gaan straight
        Um::, not really, we go straight, they go straight
15      na die adres toe
        to the address
16  PC  Okay want sy is mos in die agterkant, om die draai by die huis,
        Okay because she is mos in the backside, around the corner at the house,
17      hulle kan net miskien um vra [(……..)]
        they can perhaps um ask …    [(……..)]
18  CT                               [Is dit], is dit 'n bungalow of a wendy huis?
                                     [Is it] a bungalow or a wendy house?
19  PC  Nee, dis aan die huis maar hulle ingang is mos nou nie voor
        No, it is on the house but their entrance is mos now not in front
20      hulle ingang is agt- jy moet agter om loop
        their entrance is back – you must walk around to the back
21  CT  Okay, nee maar hulle, die ambulans sal seker voor klop of aa:
        Okay, no but they, the ambulance will probably knock in front or aa:
22      die sirene aansit
        put on the siren.
```

Note: the word "mos" is an Afrikanerism which can be directly translated as "you know then" implies that what has been said is self-evident.

A frequently occurring phenomenon in the use of other-initiated repair is the withholding of repair initiation (Schegloff et al., 1977). In other words, the repair is not placed directly after the turn of the actual trouble-source but is postponed to some later turn in the interaction (Jefferson, 1974). The expanded transition space will then usually allow the initiator of the trouble source the opportunity to self-correct (which is preferential). The caller in Extract 5 above employs such a withholding technique. The withholding is formulated using a question "who am I speaking to now?" (line 11) and in line 13 the caller proceeded to downgrade the correction with the use of a question format "Mustn't you take her name?" It is possible that the caller withheld the initiation of repair for some time during the interaction because she did not choose to initiate the repair at the time of either the dispatch or incident relevant questioning which would arguably have been more relevant.

The call taker's response in line 14 takes the form of a "no" which is indicative of the dis-preferred status of the correction i.e. treatment as disagreement. In line 14 the call taker does not self-correct which is unusual as this interactional technique, in the vast majority of cases, usually results in the initiator of the trouble source self-correcting (Schegloff et al., 1977). The refusal to self-correct and the dis-preferred status of the correction are thus indicative of the call taker's orientation to protocol. In this instance the protocol does not require the patient's name to be recorded.

This particular repair is extended by a number of turns. In line 16 the caller proceeds to explain that the entrance to the patient's living quarters is at the back of the house. The caller is clearly orienting to her interactional responsibility as caller and the concomitant action of providing an adequate formulation of place in order to accomplish the task at hand (Heritage & Clayman, 2010; Lerner & Kitzinger, 2007). Throughout the exchange the call taker orients to the known emergency call protocol as is evidenced by repeated reformulations of how the ambulance crew usually go about finding patients. The term *cargo syndrome* has been used to describe the phenomenon whereby call takers display an indifference to the patient as they become like a commodity which has to be transferred (Jefferson & Lee, 1981). On the other hand, the dispatch relevant and incident related questioning pertaining to the patient become important negotiating tools for the caller on behalf of the patient (Chappell, 2005). It provides the opportunity to negotiate goals and roles in the ensuing talk with the aim of co-generating the most suitable outcome. Levinson (1992) described this as contingencies of interaction which have potential for convergence or divergence.

Repair as interactional resource used by public caller.

Extract 5 is an instance which showed divergence in the interactional contingencies in that the repair space stemmed from a differential understanding of interactional responsibilities and rights (Leppänen, 2005). The call taker was orienting to the known established protocols and proceeded to demonstrate knowledge of such to the caller. In contrast, the public caller was orienting to the specific task at hand and her responsibility to provide an adequate formulation of the patient's whereabouts. An interesting observation in this extract was the call taker's lack of responsiveness to the essential purpose of the caller's correction as evidenced firstly by a refusal to self-correct and secondly by the dis-preferred status assigned to the correction. The issue at hand is not a question of right or wrong. Rather it shows that there appear to be levels or degrees to which participants engage in order to generate mutual understanding and to demonstrate this understanding to one another. Incorrect or inadequate information regarding the exact location of a patient is a common problem in emergency services and

often leads to ambulance delays, potentially tying up scarce resources. At times ambulance crews are unable to find a patient based on information provided. Thus a clear formulation of an address is imperative. In light of this one could have expected the call taker to make more use of the interactional space that was opened up by the caller through the use of repair. However, this finding is similar to that found in a single case analysis by Raymond and Zimmerman (2007) in which call takers resisted change to the known protocols even when circumstances called for alternative strategies. Thus, it is the preservation of the structure of the call that appears to be paramount.

Collection 3 – Other-initiation of repair

Extract 6 below will be recognized from earlier in this paper pertaining to a call from a member of the South African police services calling on behalf of a rape victim. The extract picks up where the sergeant has provided his name and telephone number, an important piece of dispatch relevant information. According to protocol the call taker would typically request an address and then move to incident related questioning.

Extract 6 (2013010110402); public caller - '*You have been sanctioned*'

Other-initiation of repair (type of trouble source – repair on procedural selection)

(CT = call taker; Police = a member of the South African police services)

```
17   Police  5111 .hhh.  Okay:: to whom I speaking to?
18   CT      Debbie, sergeant
19   Police  Debbie who?
20   CT      Debbie
21   Police  Debbie?
22   CT      Yes
23   Police  Can I have a number there Debbie? I mean a reference number,
24           Sorry
25   CT      I'll give you one now once I take all the detail and where,
26           where's this taking place?
27   Police  At Stellenbosch railway station
```

Perhaps because the sergeant was asked for his name and number he proceeds to ask the call taker for her name (line 17). The sergeant's sense of the reciprocal nature of the interaction also becomes apparent in that he initially asks the call taker for her number (line 23) but then self-corrects to return to the business at hand and requests a reference number (line 23). However, the sergeant's request was, so to speak, rejected by the call taker. In other words, the request for a reference number was deemed incorrect by the call taker. This is evident as in line 25 the call taker declines the request for a reference

number to be issued. The fact that the call taker considers this request inopportune at this stage of the business at hand is further evidenced by an immediate take-up in the next turn (line 25)[2]. Research has shown that when a participant displays a lack of knowledge in a particular domain it is typically sanctioned via appropriate means by those possessing the knowledge of the relevant institution (Garfinkel, 1967). The call taker re-aligns to the protocol by proceeding with interrogative questioning (line 26). The shift in topic appears to be acceptable to the sergeant as he complies with the request to first supply dispatch relevant information (line 27) and does not withhold the accomplishment of this task (Atkinson & Heritage, 1984).

Repair as interactional resource used by call takers.

A characteristic of turn taking in ordinary conversation is its more impromptu nature (Heritage & Clayman, 2010). In ordinary conversation participants do not undertake a conversation according to any prescribed format but rather the conversation unfolds in manifold ways at each relevant transition place. In this context transition relevant places are logical spaces in the conversation that arise where each speaker has the opportunity to continue the conversation with freedom to choose content (Sacks et al., 1974). However, this is in contrast to the restricted turn taking system in an emergency call whereby the call taker is required to ask questions and the caller is obliged to answer accordingly and the interaction proceeds according to a pre-determined format (Heritage & Clayman, 2010). As in Extract 3 (*"The all-important classification*"), to the uninitiated in the emergency call industry, the sergeant's question in line 23 does not present a discernable error (Lerner & Kitzinger, 2007). If there is no discernable error the question that again arises is what purpose did the repair serve? The sergeant, being unfamiliar with the turn-taking system of an emergency call was subsequently sanctioned for asking for a reference number. He appeared to be corrected on two accounts: firstly, he asked for a reference out of sequence (line 25) and secondly, by asking a question he was inverting the turn-taking system - it is the call taker's prerogative to ask questions and not the other way around. The call taker's orientation to a prescribed turn-taking system is re-affirmed when in line 26 she proceeds to take up the questioning role. Further to this she continues to glean dispatch relevant information and thus brings the interaction back on track with regards to content.

[2] With regards to the theory of repair, there is not only a distinction between self and the other but a distinction can also be made between the initiation of repair and repair proper. Thus this particular extract demonstrates a phenomenon found in this dataset called "Other initiation of repair" in which the caller often initiates but is not able to follow through on the repair because procedural selection by the Call Taker tends to override the initial repair almost in the form of a counteractive repair.

But how does this use of other-correction or other-initiated repair fit with research regarding the preference for self-initiated rather than other-initiated correction? Typically one would expect a more constrained use of other-initiated correction however, in their seminal paper on repair in conversation Schegloff et al. (1977) made mention of two possible exceptions to the usually more constrained use of other-correction. The first is the parent-child interaction and the second is those who are regarded as not-yet-competent in a specific area, irrespective of age. In these types of scenarios repair thus serves as a means to socialize others. Thus in order for call takers to preserve the smoothness of the routine operation when dealing with the not-yet-competent, repair and specifically other-initiated repair becomes an important interactional device. If other-initiated repair is used by the call-taker to assist the novice caller then it would be expected that this would be a frequently occurring phenomenon in the public corpora. This was found to be the case. In fact, it is this phenomenon which resulted in the interrogative phase becoming lengthy and in many instances labored (as shown in the analysis of overall call structure).

The attribution of interactional difficulties to knowledge asymmetries has been documented in emergency call literature (Heritage & Clayman, 2010). However, this research showed the resourcefulness of participants in managing differing levels of knowledge and protocols. Of note was that repair as used in both Collections 1 and 3 (albeit different types of repair – self-initiated versus other-initiated) was ultimately used for the same purpose, to reorient to the known routinized protocols. In Collection 1, the 107 caller demonstrated knowledge of protocols through self-initiated repair and the call taker acquiesced. However, in Collection 3 the call taker stepped in to socialize or assist the caller following what was considered an ill-advised initiation of repair and so responded with a counteractive repair. This is further evidence of participants' ongoing analysis of an interaction and the ability of the call taker to customize strategies based on the level of knowledge of the recipient. It should be noted that the primary purpose of this socialization was to assist in orienting the caller to routinized protocols.

Collection 4 - Embedded repair used by public callers, 107 callers and call takers

In line with the aforementioned findings of customizing an interaction based on taking cognizance of the other participant, this data set (both 107 and public corpora) showed an interesting mixed pattern of recipient adaptation (tailoring to the recipient) with respect to language usage by means of embedded

repair. An interesting feature of conversation is that whilst many tasks are done explicitly there are some which are accomplished implicitly. Embedded repair is implicit in nature (Jefferson, 1987). Although it was previously noted that repair usually brings with it attendant activities which can be regarded as different forms of accounting, embedded repair is an exception. Extracts 7 and 8 below show embedded repair of which the most notable feature is the lack of talk directed at the trouble source. In other words, neither of the participants draws attention to language as a potential trouble source in an explicit way. Although there is still an element of correcting, the accounting element is missing. This is in contrast to other types of correction which usually expose the trouble source (Jefferson, 1987).

Extract 7 (2012122610198); public caller – '*Language switching as responsiveness*'

Embedded repair - switch to Afrikaans

(CT = call taker; Public = public caller)

Note: this extract has also been translated. Translated items have been styled in a bold font

1	CT	Emergency Medical Service, Juanita speaking. What's your
2		emergency?
3	Public	Aa: Goeie more mevrou. (.) Aa: (.) ons het nou (……..)ambulaans
3		**Aa: Good morning misses. (.) Aa: (.) we now (…..…….)**
4		Nodig
4		**need ambulance**
5	CT	Wat is die adres daar mevrou?
		What is the address there misses?

In Extract 7 above the call taker opens the call in English (line 1) which is standard protocol for this EMS centre. However, the caller uses Afrikaans for her response in the opening sequence and further to this formulates the request for an ambulance in Afrikaans. There is no overt form of repair (lines 3-4). (This data set did include some instances in which a caller overtly requested permission from the call taker to speak in Afrikaans. This would be regarded as a form of other-initiated repair due to its explicit nature). However, in line 5 of Extract 7 above the call taker reciprocates by switching to Afrikaans without drawing attention to it, thus the flow of talk and the business at hand was not disrupted in any way. Of note, the entire call continued smoothly in Afrikaans. Extract 8 below also demonstrates the use of embedded repair however with a different outcome.

Extract 8 (20121228101149); public caller – '*Language switching for routine purposes*'

Embedded repair – switch from English to Afrikaans and back to English

(CT = Call taker; Public = public caller)

Note: this extract has also been translated. Translated items have been styled in a bold font

1	CT	Emergency services ( )
2	Public	Um goeie dag, kan ek 'n um: a-ambulaans kry by vier Republiek
		Um good day, can I get an um: a-ambulance at four Republic
3		straat asseblief?
		street please?
4	CT	(.) vier?
		(.) four?
5	Public	Vier Republiek Straat, Welgemoed
		Four Republic Street, Welgemoed
6	CT	Re-pu-bliek?
		***Re-pu-bli*ck?**
7	Public	Ja
		Yes
8	CT	(.) Which area? Somerset West?
9	Public	Dis in die Paarl
		It's in the Paarl
10	CT	( ). Aa: house number four, the telephone number?
11	Public	Um: 0-2-1

Extract 8 above, in contrast to Extract 7, eventually plays out in English only. The call taker's opening was formulated in English (line 1), the caller however formulated her response and proceeded with the request sequence in Afrikaans (embedded repair) and the call taker then reciprocated in Afrikaans (lines 4-6). However, if one drops down to line 8 it shows how the call taker used embedded repair to shift the conversation back into English. In line 11 the caller reciprocated by responding in English and the remainder of the conversation was conducted in English.

Repair as interactional resource used by public callers, 107 callers and call takers.

Even though embedded repair is implicit in nature it is a two-way exchange in which callers and call takers clearly collaborated with one another. These extracts showed that participants did not seek to address a lack of competence with respect to language. This bears out research on the lack of the accounting element in embedded repair (Jefferson, 1987). What was of particular interest in Extract 7 was the willingness of the call taker to conduct the call in Afrikaans. She demonstrated language competency and instituted a measure of responsiveness to the repair space invoked by the embedded repair. In contrast, in Extract 8 the call taker clearly demonstrated fluency in Afrikaans and thus also demonstrated competency yet he chose to revert to English. Thus it is suggested that if competency is not the issue at stake, in this instance, perhaps adherence to routinized protocol is. Also of note is how

callers, and particularly the caller in Extract 8, corroborated with the call taker. This is evidence of the fact that even when callers have limited knowledge of emergency call procedures they do demonstrate some regard for possible constraints that may emerge because of the institutional nature of the encounter (Raymond & Zimmerman, 2007).

Summary of findings from the collections

Findings from the 107 corpus.

The 107 data set constituted a recipient design with greater levels of symmetry with respect to institutional knowledge and protocols. Investigation of the overall call structure showed an altered (reduced) request-response format as well as the reduction of turns in the interrogative series in the 107 corpus. This was suggestive of the more streamlined phases/sections of 107 calls. This led to an exploration of the interactional strategies deployed to achieve such remarkably trouble-free interaction. A significant finding was the frequent use of self-initiated repair which, as discussed previously, usually occurs within the same turn-constructional unit as the trouble source. This together with pre-emptive strategies resulted in more streamlined interactions overall. However, with regards to repair, the most frequently used form of self-initiated repair was not a typical type as identified by Schegloff et al. (1977): word replacement, repair on person-reference and next-speaker selection repairs. Rather, repair on procedural selection was used. The purpose of this was to re-orientate participants to the routinized protocols of the institution. Heritage and Clayman (2010) would regard the frequent use of self-initiated repair as evidence of knowledge of the pre-allocation of an emergency call's turn taking system. Further empirical support of the impact of routinized protocols on emergency call activities was the use of pre-emptive strategies. Pre-emption was used by the 107 caller to steer topical direction by forward feeding dispatch and incident related information to the call taker. To forward feed is to provide information to the other participant prior to any form of prompting (Schegloff, 1986). In order for this to occur the participant requires some form of knowledge of what comes next. In the 107 data set this phenomenon resulted in the call taker being able to reduce the number of questions asked to a minimum. In summary, it appears that choices of interactional strategies showed that the 107 interaction was customized based on participants' understanding of the recipient's knowledge levels and desired outcomes.

Findings from the public corpus.

The public corpus constituted a recipient design with greater levels of asymmetry with respect to institutional knowledge and protocols and as such showed different patterns of interaction to the 107 corpus. Investigation of the overall call structure showed a more traditional request-response format as well as an elaboration of the interrogative series. Whilst the overall shape of the emergency call still resembled that of the literature, the interrogative series was often extended due to lengthy negotiations. Call takers' attempts to secure quality dispatch relevant and incident related information often necessitated the use of repair resulting in multiple turns before understanding was achieved. This was in sharp contrast to the truncation and specialization in the 107 corpus. As with the 107 corpus this finding led to an exploration of the interactional strategies deployed by participants. A significant finding was the frequent use of other-initiated repair resulting in multiple turns from trouble source, hence the elaborated interrogative series. No significant pattern of self-initiated repair emerged in the public corpus. Whereas only one pattern of repair emerged in the 107 corpus, the public corpus showed two different patterns of the use of other-initiated repair. The first pattern to emerge was the use of a type of counteractive other-initiated repair by the call taker to re-orient the caller to procedural routine and in so doing move the interaction forward. The use of this other-initiated repair by call takers was viewed as a participant resource to socialize the novice caller with respect to emergency call procedures. Thus the self-initiated repair in a 107 call and other-initiated repair in the public corpus are two different types/forms of repair and played out uniquely but were used to fulfill similar functions: orient participants to routinized procedures. The second pattern showed callers who made use of other-initiated repair as a negotiation tool with respect to what was understood as their rights and responsibilities for the tasks at hand in an emergency call. The third pattern that was evident in both data sets was a switching of language choice. This choice did not however seem to hinder the business at hand in any way.

Cases that deviated from the norm

High levels of responsiveness.

As previously mentioned, it is not surprising that due to the vast geographical areas covered by the EMS centre and poor infrastructure in disadvantaged communities, references to places (place formulations) often resulted in interactional trouble in the data set. However, Extract 9 below shows how infrastructural constraints are also, at least in part, interactional constraints which can be dealt with using a variety of interactional strategies. When a place reference is not reformulated in any way the

original formulation is taken as adequate and it results in the interaction continuing smoothly (Schegloff, 1972). However, when an initial place reference undergoes repair it is evidenced by interactional trouble (Kitzinger, Lerner, Zinken, Wilkinson, Kevoe-Feldman, & Ellis, 2013).

Extract 9 below pertains to a father who requests an ambulance for his asthmatic daughter. The prior opening and request sequences have gone smoothly however, as the call taker begins with dispatch relevant questioning, interactional difficulties arise. Kitzinger et al. (2013) purported that interactional trouble with regards to place references arise from one of two sources. Either there is some trouble in the speaking or the recipient has trouble with recognition. This extract presents both.

Responsiveness as instituted by means of other-initiated repair by the call taker

Extract 9 (25 Feb 2011 IR 10154); public caller - *'Ah, now I understand - the water filtration plant'*

(CT = call taker; Public = public caller)

9	CT	From where sir?
10	Public	Aa:: she is:, at the moment she's in aa: Constantia Nek
11	CT	Where's that?
12	Public	Aa:: Constantia Nek is in Constantia
13	CT	Okay, (.) but now do you have a better address for me?
14	Public	Ya: there is, its number two: Constantia Nek
15	CT	Oh, is that, what the street's name?
16	Public	Come again?
17	CT	What is the street name?
18	Public	No, there is, there is no street name, there is a filtration,
19		water filtration plant
20	CT	(1.0)Okay
		((The call taker proceeds to search for the location on the system and then resumes the conversation))
27	CT	'Kay, so you say it's in Constantia Nek, hey? It's the water
28		filtration pla:nt?
29	Public	Ya:
30	CT	What is that? Explain to me cos I-I don't know what it is, I
31		need to (.) understand so I can explain it to (.) the dispatcher
32	Public	The problem is that a-there is no street here
33	CT	Ya
34	Public	Ya, that's the main problem cos these streets don't have names
35	CT	Okay (.50) so (.), o::where is the best place that I can have you
36		wait with the patient
37	Public	Aa sorry (...)
38	CT	Where is the best place I can have you wait for the ambulance?
39	Public	Um there, there, there is um::: a restaurant at Constantia Nek
40	CT	Hhh Oh::::::::: okay, yes I know what you speaking about, okay,

The sequence-initiating question in line 9 “From where sir?” is met with a formulation “Constantia Nek” which forms the second part of the adjacency pair, and presents a problem of specificity rather than correctness. In lines 11 – 13 the call taker explicitly requests more specific re-formulations because those given, “Constantia” and “Constantia Nek” are not practically adequate for the task at hand i.e. dispatching an ambulance to a specific address. It is only after the call taker’s second request for a street name (line 17) that the caller begins to narrow the formulation by explaining that “there is no street name” (line 18). Due to the absence of street names, the caller is clearly having trouble in formulating the exact location i.e. (speaker trouble). In line 19 he takes up an alternative place formulation by using a landmark, “water filtration plant”. In line 21 the caller then proceeds to summarise the variety of place formulations given in order to collectively present the various alternatives he has given during the course of the interaction to aid the call taker in recipient recognition (Kitzinger et al., 2013).

In line 27 the call taker checks understanding and, as is typical in other-initiated repair, offers the check more as a clarification to be accepted or rejected rather than an assertion (Schegloff et al., 1977). When no further narrowing of the reformulation is forthcoming the call taker directly asks the caller to explain in further detail in order for the task at hand to be accomplished (line 30). The caller reiterates that there are no street names (line 32). In line 35 the call taker pursues a slightly different tack of enquiry and asks the caller where the best place would be for him to wait for the ambulance. By doing so she intimates that the reformulations to date have proved inadequate for dispatch purposes. The use of an escort is a common occurrence as ambulances often struggle to navigate through informal settlements and other areas which have little or no infrastructure. In line 39 the caller again uses a landmark as a place formulation. It is only at this point, after numerous turns from the trouble location, that recipient recognition is achieved as evidenced by an animated “oh:::::::::”.

Repair as interactional resource.

Extract 9 above demonstrates a substantial amount of interactional work done by both parties. The repair which stemmed from the initial place formulation to what was eventually deemed as an adequate formulation (enabling recipient recognition) was lengthy and resulted in numerous turns. However, the call taker was highly responsive and made full use of the repair opportunity and continued until full recipient recognition was achieved. This is significant because repair is not guaranteed a positive outcome. As shown through this data set successful as well as failed repair can be regarded as outcomes of this unique but frequently used interactional resource (Schegloff et al., 1997). The call

taker successfully prompted the caller in narrowing the formulation to achieve the most practicable solution. Lerner and Kitzinger (2007) have termed this a 'step-wise recalibration'. However, to drive home the level of responsiveness to this repair it is useful to consider an alternative scenario for this call's trajectory. There were numerous points in the interaction at which the call taker could have prematurely ended the repair prior to achieving recipient recognition. The risk would have been poor quality information forwarded to dispatchers and ultimately the delay of the ambulance. However, the entire duration of the call from which Extract 9 was taken was four minutes and twenty-five seconds. This is just over double the stipulated protocol of two minutes per call. Lengthier calls were not unusual in the public data set due to the interactional difficulties that were frequently encountered.

Nowhere does the complexity of the call taker's tasks become more evident than when considering this issue of time constraints. Thus it becomes clear that the call taker must manage the competing contexts and tasks associated with routinisation and responsiveness. This becomes synonymous with issues around efficiency (time) and effectiveness (quality of information). Whilst routinisation is both necessary and helpful to the emergency call as institution, Extract 10 demonstrates that without some measure of responsiveness important interactional opportunities may be missed.

High levels of routinisation and the call taker's dilemma – even symmetry can go wrong.

Extract 10 below is a call from a 107 caller reporting a possible heart attack. The patient is reported to be unconscious, not breathing and with a weak pulse. The extract begins after the opening and request phases have been completed. The call taker's clarification of "No breathing?" (line 1) is indicative of an acknowledgement that this incident translates into a priority 1 call. This is further evidenced by an offer for someone to guide the caller through cardiopulmonary resuscitation (CPR) (lines 3 and 6).

Routinisation as instituted by means of other-initiated repair by the 107 caller

Extract 10 (2012123110438); 107 caller – '*The call taker's dilemma – even symmetry can go wrong…'*

(CT = call taker; 107 = 107 caller)

```
1     CT    No breathing?
2     107   Yes
3     CT    Okay, do you want me to put you through to someone that can
4           help (.) or maybe (.) to::: umm: (.) guide the patient through (.)
5           [the, caller (.) through (…)]
6     107   [It's up to you]. I don't know? It's up to you.
7     CT    Okay I'll get someone (…..)
8     107   Sure↑
9     CT    (7.0) Um (.) is the caller on the line?
10    107   Yes, the caller's on the line↑, I need to give you the address
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```
11          first [before I (…)]
12    CT          [ja::, before], ja, before I can do anything
```

In the analysis of overall call structure for the 107 data set, the selective use of pronominal choices was noted as a significant element of the request phase. Extract 10 above clearly shows how such, seemingly insignificant, choices are used to achieve specific purposes with respect to the task at hand. In line 6 the 107 caller responds to the offer made by the call taker to get someone to help guide the caller through CPR by saying "It's up to you" (with an emphasis on the word "you"). This formulation is subsequently repeated by the 107 caller for emphasis. The 107 caller's pronominal choice invoked hierarchical position based on institutional identities (Psathas, 1995). In this instance the purpose appears to be the delineation of responsibility and accountability.

Subsequent to the call taker's decision "Okay, I'll get someone" (line 7) she enquires if the caller is on the line (line 9). The 107 caller's answer "yes, the caller's on the line↑" (line 10) is thus a relevant next turn. At this point it is evident that the call taker has made the decision to get CPR support for the caller and needs to establish if the caller is on the line for such. The 107 caller's response (line 10) would typically be regarded as an adequate formulation to the prior question and thus signal the end of the turn. The resultant transition space would signal the call taker as next speaker who would continue to move the call forward in the chosen direction. However, through an upward inflection in her voice on the word "line↑" the 107 caller does not create such transition space but rather continues her turn with "I need to give you the address first" (line 10). In so doing the 107 caller introduces a repair space. The type of trouble source is repair of procedural selection. Of note is that usually other-corrections are downgraded through the use of an uncertainty marker whereby the initiator would use a more hesitant inflection of tone and/or lexical choice to draw attention to the trouble source e.g. "I think" (Schegloff et al., 1977). However, in this extract the tone of voice appears to the listener to be quite insistent e.g. "I need" with an emphasis on the word "need". The 107 caller thus proceeds to orient the call taker to procedure by suggesting that the address must be given first before a next step can be instituted (lines 10 and 11). By using the word "first" in line 11 the implication is that to continue the interaction with anything other than the address would be procedurally incorrect. This is similar to findings from Collection 1 '*First things first*' (Extract 4) and Collection 2 '*Don't you need her name?*' (Extract 5) in which the preservation of the structure of the call appeared to be an over-riding context taking precedence over all other matters.

Repair as interactional resource.

The repair in this instance was initiated to orient the participants to the known routinized protocols. The call taker joined this endeavor as she did not withhold the accomplishment of the repair despite that it represented a clear departure from the route that had already been negotiated. What is of considerable import is that the time taken to comply with protocols resulted in a four minute delay before the 107 caller and call taker returned to the most pressing matter, that of administering CPR to the patient.

In light of the call taker's knowledge of the urgency and priority of the call, the question that begs is "why did she acquiesce to the repair on procedural selection and not address the most pressing task at hand?" Firstly, the influence of the collaborative nature of an emergency call is clear. It is the ongoing negotiation between call taker and caller which strongly influences the trajectory of a call. This has important implications for call taker training which will be discussed under *Implications* in this document. Secondly, people are agents who hold one another accountable on a number of levels (Heritage, 1988) and perhaps more so in the institutional context. Perhaps because of high levels of knowledge symmetry the 107 caller is regarded as an equal because he/she demonstrates high levels of competence through the use of strategies of pre-emption and self-initiated repair. That the call taker possibly assumes this view of hierarchical equality with the 107 caller is understandable considering that the aforementioned strategies result in the 107 caller taking the anchor position within the call (from a structural viewpoint). The anchor position is that turn-taking position held by the participant who raises first topics (Schegloff, 1986). This reversal of the anchor position potentially results in several additional sources of possible confusion e.g. the inversion of the turn-taking system.

However, in the event of the unusual such as Extract 10 above, the 107 caller clearly shows that in spite of knowledge symmetry there are differential rights and responsibilities. It is the call taker who is ultimately responsible for the dispatch of an ambulance and associated tasks e.g. stabilizing a patient. In contrast, the role of the 107 caller appears to be more like that of a relay station. Once information has been forward fed to the appropriate service whether the police, fire department or ambulance services, the 107 caller is discharged of his/her duty. Perhaps there is confusion around these important matters as is evidenced by the call taker's question to the 107 caller "`Okay, do you want me to put you through to someone that can …`".

The dilemma for the call taker is that on the one hand routinized protocols are necessary to move the call forward in the most efficient manner possible. Without protocols the call taker would be unable to fulfill his/her role. However, on the other hand blind adherence to protocols can result in missed interactional opportunities which can be a matter of life or death in the event of an emergency call.

Chapter 5 –Discussion and conclusion

This study began by acknowledging previously documented asymmetries of knowledge as an important institutional dimension within the emergency call (Heritage & Clayman, 2010). However, the two data sets (107 and public) afforded a unique opportunity to compare, through a series of collections that were assembled, how (with what strategies) participants in an interaction manage differing levels of asymmetry. Finally, deviant case analysis shed some light on wider patterns showing why participants used these strategies and whether they aided or impeded the emergency call interaction. One of the most remarkable features across both data sets was participant's ability to customize the interaction based on who they were talking to and what level of knowledge the recipient displayed. Thus participants used different types of strategies based on an ongoing analysis of appropriateness of next turn and topic. This phenomenon of tailoring of an interaction based on the relationship with the recipient was first identified by Schegloff (1986) however this paper shows how repair, as interactional strategy, was uniquely customized for recipients. Conversational repair thus formed the analytic focus across the data sets as different forms/types of repair were used for different purposes based on these unique relationships. Below is a discussion of how the findings fit in with literature to date.

Symmetry of knowledge and 107 call customization.

The 107 callers' high levels of knowledge of emergency call protocols (knowledge symmetry) enabled them to assist the call taker in moving key phases of the emergency call forward with a greater degree of brevity than would usually be found. Although Wakin & Zimmerman (1999) showed a reduction and specialization in emergency call interaction it should be noted that their study contrasted institutional versus ordinary conversations. This study contrasted two data sets both of which would be regarded as institutional conversation. As such, this research shows that the altered request/response sequence and the frequent use of self-initiated repair and pre-emption in 107 calls resulted in further increases in levels of truncation i.e. more than would be expected. This was notably because both participants were able to orient to and display high levels of socialization with respect to the routinized protocols of the emergency call. The collaborative nature of this orientation to protocol is evidenced in that call takers did not attempt to socialize 107 callers through the use of other-initiated repair. This was because 107 callers took it upon themselves to assume the anchor position and in so doing did the bulk of the interactional work with respect to orienting to the protocols. The call takers' role was thus one of acquiescence to 107 callers' strategies. Overall, the strategies adopted by 107 callers showed strong

claims to both access to and knowledge of protocols. This bears reference to Sidnell's (2012) findings that knowledge asymmetries lead to varying degrees of claims of certainty of what is known.

Asymmetry of knowledge and public call customization.

Whilst 107 callers showed strong claims to knowledge, public callers showed the opposite pattern. Public callers often downgraded repair which is reflective of this weaker claim to knowledge. Public callers' use of repair did not concern routinized protocols but rather stemmed from a differential understanding of interactional responsibilities and rights. This is in line with work done in more traditional health care settings (Leppänen, 2005). Public callers thus tended to use repair spaces as important interactional opportunities to negotiate and co-generate suitable outcomes on behalf of the patient. However, this collaboration was reliant on both parties making effective use of the repair space. This proved problematic at times because call takers' response to and initiation of repair usually involved re-orienting the caller to routinized protocols rather than consideration of rights and responsibilities. The call taker thus predominantly used repair spaces to socialize the not-yet competent caller to routinized protocols.

In many instances the call takers orientation to routine proved so pervasive that when public callers introduced a trouble source (through the use of other-initiated repair), call takers tended to display an unwillingness to self-correct and continued to orient to protocols in order to advance the interaction. This is unusual in light of theory on repair which suggests that other-initiated repair usually results in the initiator of the trouble source self-correcting (Schegloff et al., 1977). However, this finding bears relation to that of Raymond and Zimmerman (2007) in which call takers resisted change to known protocols even when circumstances called for alternative strategies. The aforementioned study included multiple calls pertaining to a single event and as such could potentially have been regarded as a once-off finding. However, this research corroborates this type of pattern across a large and varied data set over a four-year period. Thus this data set has shown that call takers generally have a heightened sense of adherence to routinized protocols in the emergency call.

Language customization.

The use of embedded repair for the purpose of language switching within the emergency call bears out research in the arena of ordinary conversation and language usage. The findings of Hosoda's (2006) study are perhaps especially relevant to this study in that it was conducted using Japanese first and

second language speakers. However, whilst Hosoda's study showed participants non-attendance to errors in language, this data set showed non-attendance with reference to switching from one language to another. This was either as a form of responsiveness to recipient design or for the purpose of adherence to protocols. However, irrespective of the purpose, participants did not consider language competency a matter of accountability as evidenced through the use of embedded repair. This finding was perhaps firstly a reflection of the language demographic of the Western Cape in which Afrikaans is the first language of approximately half the population. Secondly, it showed that even callers who demonstrated limited knowledge of emergency call procedures showed regard for possible constraints due to the institutional nature of the emergency call (Raymond & Zimmerman, 2007).

The role of repair.

This research showed the profoundly important role of repair as an interactional strategy to manage constraints within the emergency call interaction. Identified constraints which necessitate the use of repair can be broadly classified into the following two categories:

Constraints inherent within the institutional nature of the emergency call.

The call taker is first and foremost constrained by the institutional nature of the emergency call which tends to "lock aspects of interaction into a set of predefined categories" (Maynard & Heritage, 2005, p.428). It is precisely because of this pre-defined nature of many elements of an emergency call that it can be regarded as a routinized activity (Schegloff, 1986). This was strongly evidenced in the data and has been discussed at length in this paper. However, what does bear mention again is the somewhat unique form of repair that emerged in this data set as a result of participants' attempts to manage these institutional constraints. Repair on procedural selection was a form of repair unique to this data set. This is distinctive from the previously identified repair forms , namely: repair on next-speaker selection, word replacement and repair on person-reference.

Constraints arising due to knowledge asymmetries.

In addition to inherent constraints, the call taker is faced with the knowledge constraints of the caller. It is unavoidable that participants enter an emergency call interaction with varying levels of prior exposure and/or knowledge of the protocols unique to this institution. The call taker is thus required to customize any given call on an ongoing basis based on recipient design. However, the call taker's dilemma is that on the one hand routinized protocols (inherent constraints) are necessary to move the call forward in the most efficient manner possible yet, on the other, this data set has shown that this

drive may be at the expense of achieving interactional understanding. Without protocols the processing of high volumes of emergency calls would not be possible. The streamlined efficiency and short call duration of the 107 corpus is evidence of what can be accomplished when both parties share some form of knowledge base of emergency call protocols. However, lack of responsiveness resulted in missed interactional opportunities which often compromised the quality of information or mutual understanding of rights and responsibilities. This finding is in a similar vein to Jefferson and Lee's (1981) finding of contamination between the environments of a troubles-telling and a service encounter whereby the differing contextual environments each required unique activities to be accomplished.

The dilemma.

In this research the two competing environments have been contextualised as routinization versus responsiveness. The primary driver around the routinized environment appeared to be adherence to time constraints. It is suggested that for the most part call takers' rigid adherence to the sequence of procedures was an attempt to reduce call duration. This however potentially results in gleaning poor quality information. Note however that quality of information generally did not appear to be a pressing driver in comparison to time constraints. Heritage and Clayman (2010) purport that competing processes tend to build stability or encourage agency and change. It is suggested that this data set showed that processes were predominantly used to build stability. Patterns that showed increased orientation to routinized protocols tended to result in decreased orientation to more collaborative activities and in particular responsiveness to the repair space. However, this finding is not unique in the health care sector as research in doctor-patient interactions has revealed decreased initiative shown by both parties due to time limitations (Sandén, Linell, Starkhammar, & Sätterlund Larsson, 2001). Thus the call taker's predicament truly is a dilemma and not one that can be easily solved.

A final word on asymmetry.

Intuitively one would assume that knowledge symmetry would be preferable to asymmetry within the emergency call interaction. For example, a large body of the literature on doctor-patient interactions has focused on attempts to reduce epistemological asymmetries (Heritage & Clayman, 2010). However, this research shows and in particular Extract 10 ('*The call taker's dilemma – even symmetry can go wrong…')* that knowledge symmetry is not necessarily always an advantage. In Extract 10 despite high levels of shared knowledge of emergency call protocols there remained a lack of understanding of

differential rights and responsibilities of the participants. Despite symmetry, there was not a mutual orientation by both parties to knowledge and understanding of the relative importance of the priority at hand (Schegloff, 1986). Thus the onus rested on the call taker to take the lead however, perhaps due to the entrenchment of routinized protocols, this did not happen. This is suggestive that the real advantage lies neither with respect to knowledge symmetry nor asymmetry but rather the call taker's ability to maximize the collaborative nature of the interaction and effectively negotiate on a moment by moment basis through the judicious use of repair and other relevant interactional strategies. Thus this research also furthers an understanding of knowledge asymmetries within institutional contexts and how these practically play out.

This paper does not serve to position one context (routinisation versus responsiveness) over the other with respect to an emergency call. In an emergency both contexts are necessary and beneficial. High volumes of emergency calls would not be possible without some form of protocol. Yet, on the other hand the call takers greater responsiveness and willingness to make use of created repair spaces would result in the ability to glean better quality information.

Limitations of the study

Video recordings - the introduction to this paper outlined the collaborative role of the call taker as part of a broader systemic framework. It is the use of a computer aided dispatch system (CAD) which inextricably links the activities of the call taker to the dispatcher and paramedics within this system. Studies contrasting audio recordings with video recordings are rapidly adding to the body of knowledge of the social organization inherent within emergency call processes (Fele, 2008). The use of video recordings is suggested for future research particularly when considering collaboration between the call taker and dispatcher via the CAD system.

Triangulation – it might also have been useful to conduct reflective interviews with call takers about their work and the nature of the routines and protocols used. This would have enabled some form of triangulation which is useful for qualitative analysis.

Strengths and implications of this study

Managing culture and intersubjectivity - conversation analysis provided a useful and sound methodological alternative to conceptualise intersubjectivity by exploring the structural forms for activities (Atkinson & Heritage, 1984).

Sequential organisation as enabler for the study of collaboration – the preservation of turn-by-turn sequences in conversation analysis provided a systematic tool for understanding collaboratively produced activities. Conversation analysis is concerned with how participants share methods and strategies in order to create understanding and accomplish certain tasks (Heritage, 1988). Thus this research made possible the analysis of not only the activities of the initiator but also the responsive treatment thereof (Atkinson & Heritage, 1984).

Preservation of raw data for further analysis - because the audio recordings are available in their natural format and the data has not been altered by a particular research design, it is available for further enquiries using the same or complementary approaches with a view to possible integration of findings (Heritage, 1988). There remains a wide range of interactional phenomena to be studied and further studies will enlarge the body of knowledge of emergency call interactions in South Africa.

Exploration of all five phases of an emergency call - much of the earlier work on emergency calls focussed on the opening of the call as a type of locus of order (Cromdal, Osvaldsson & Persson-Thunqvist, 2008). However, this study was in line with current trends in which an interactional phenomena is explored irrespective of the phase of the call in which it occurs. This enabled analysis of participants continued reorientation to specific contexts throughout the call.

Implications for theory.

Epistemological asymmetry - this study has shown the usefulness of shifting the focus from merely identifying the asymmetric character of an emergency call to the multiple ways in which participants manage these asymmetries and obtain mutual understanding.

The link between human interaction and institutional change – because of their very nature, routines are often not reflected upon (Osvaldsson et al., 2012). However, as an exploration of routinized protocols, this study has provided a detailed analysis of what participants actually do with routines rather than what should be done. As such it forms part of an emergent field of research in public health care which connects interaction with institutional change (Greenhalgh, 2008).

Repair on procedural selection – repair on procedural selection was identified as a unique form of repair. Considering the wide use of computer aided systems across many industries it is suggested that this conceptualization of repair may prove useful to other studies.

The question of language

The body of knowledge with respect to language in emergency calls is relatively small. This research adds to this growing body of knowledge in showing the frequent use of embedded repair amongst English and Afrikaans speakers in the Western Cape. It is indicative that language is not regarded as an accountable matter when used by first and second language users.

Implications for practice.

Training

This paper has shown that "Small behavior sequences are deeply aligned to the workings and ideology of large institutions, and changes in these sequences can have great significance for the nature of the institution and how its workings are managed" (Heritage & Clayman, 2010, p. 32). More specifically this research has shown the highly collaborative nature of an emergency call and the importance of customising based on recipient design. As such it is suggested that training for call takers be more dialogic in nature. The following are practical recommendations for possible inclusion in a training package for call takers:

- Interactive training - the emergency call was shown to be more than information transfer (Osvaldsson et al., 2012) and is highly collaborative. Training should reflect the collaborative nature of a call e.g. role playing recipient customisation.
- Create an understanding of the constraints inherent within the institution of the emergency call as well as constraints due to knowledge asymmetries.
- Practical tools for establishing understanding e.g. repair (all its different forms), understanding checks, clarification etc.
- Inclusion of reflective practices for call takers e.g. mindfulness techniques to increase call takers' awareness of balancing routinisation and responsiveness.
- Institute regular debrief sessions – to continuously revisit customisation issues based on the unique demographics of the Western Cape.

As Anthony (2011) purports, even seemingly modest changes in the education of emergency medical service providers can lead to significant results.

Key performance indicators for call takers

The evaluation criteria for call takers are primarily quantitative. Currently the key marker of effectiveness is elicitation of required information within a two minute time period. However, this paper has demonstrated that due to the collaborative nature of an emergency call, qualitative criteria should possibly be included in addition to quantitative criteria. This research has shown that time constraints need to be weighed up against the quality of information gleaned.

Geographical constraints as interactional constraints

This study has shown that geographical constraints are arguably as much interactional constraints as infrastructural ones. This links to Whalen and Zimmerman's (1987) conceptualization of the pre-eminence of interaction in that "out there is possibly closer to where we lead our everyday lives than previously thought" (p. 182). This paper showed how geographical constraints can potentially be resolved interactionally. This revised conceptualization of geographical constraints in emergency calls has important implications for future emergency medical services research. One possibility is that practical solutions to geographical constraints can be supplemented with more effective interactional strategies.

Conclusion

This research afforded a unique opportunity to analyse the many ways in which participants to an emergency call manage asymmetries of knowledge. The 107 and public corpora showed that participants' choice of interactional strategies was customized based on their assessment of recipient design and in particular knowledge asymmetry. However, whilst knowledge asymmetries posed some constraints, an overriding interactional constraint inherent within the institutional nature of the emergency call was identified in the form of a rigid adherence to routinized protocols. The call taker's dilemma was thus identified as the management of these constraints through the frequent use of conversational repair. On the one hand a level of responsiveness is required to glean quality information from callers, particularly when knowledge asymmetries are present. However, on the other hand high volumes of emergency calls would not be possible without routinized protocols. It is suggested that for the most part call takers' rigid adherence to procedures was an attempt to manage high call volumes through the reduction of call duration. However, the issue of time constraints appeared to be a more pressing driver than quality of information gleaned. As such, patterns that showed increased orientation to routinized protocols tended to result in decreased orientation to responsiveness and more collaborative activities and in particular responsiveness to the repair space. This research also showed that knowledge symmetry is not necessarily more advantageous. Quality information, gleaned in the shortest possible time, is reliant on the call taker's ability to maximize the collaborative nature of the interaction and effectively negotiate on a moment by moment basis through the judicious use of repair and other relevant interactional strategies. This topic has been deemed worthy of the many hours invested because unlike many other types of interaction, misunderstandings in an emergency call interaction have implications which can, for the patient, ultimately translate into matters of life or death.

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Appendices

Appendix A - Ethics Clearance Certificate

M110301M110301

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Professor Claire Penn

CLEARANCE CERTIFICATE	**M110301**
PROJECT	Identifying Communication Facilitators and Barriers in emergency Medical Calls in South African Context
INVESTIGATORS	Professor Claire Penn.
DEPARTMENT	Speech pathology & Audiology/SHCD
DATE CONSIDERED	25/03/2011
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor :

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

Appendix B – Glossary of transcript symbols

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

[	A left bracket	Onset of overlap of speech
]	A right bracket	End of overlap of speech
=	Equal signs	No break or gap in the talk from one speaker to the next
=	Single equal sign	No break or gap in an ongoing utterance where it would be expected
(0.5)	Numbers in parentheses	Pauses or elapse of time (tenths of seconds)
(.)	A dot in parentheses	A very brief pause (one tenth of a second)
_	Underscoring	Indicates the stress or emphasis of a word
::	Colons	The lengthening of the previous sound
↑↓	Arrows	Change to high or low pitch
?	Italicized question mark	Slightly weaker rise than a normal question mark would indicate
.hhh	Dot-prefixed row of h's	Inbreath
hhh	Row of h's	Outbreath
Rohhhw	Row of h's within a word	Breathiness
( )	Empty parentheses	Transcriber unable to hear/decipher what was said. The length correlates to the length of unheard talk
(( ))	Double parentheses	Comments/descriptions by the transcriber