The "Four-Second Rule" for Identifying the Active Silent 911 Caller

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ABSTRACT

Introduction: With advances in wireless technology, the volume of unintentional calls, or misdials, to 911 call centers has steadily increased over the past 10 years. While call centers have been working to manage call volume, there is very little systematic research on how to develop policy for handling Active Silent calls where callers may be unable to verbally communicate.
Objectives: The primary objective in this study was to first establish how dispatchers manage nuisance calls, and then provide a systematic way of determining how dispatchers can maximize their opportunities for identifying a real emergency within this category of calls.
Method: The research protocol applied to this study is a descriptive, naturalistic method called conversation analysis, which is the science of analyzing talk in natural settings. We identified patterns within each interaction by calculating when silences occurred and how long dispatchers waited for callers' responses.
Conclusion: As a result of patterns observed in Active Silent calls, we offer the "four-second rule," which stipulates that Active Silent callers need at least 4 seconds to respond to dispatchers' silent call prompts. By examining the incoming calls, we are able to offer a recommendation for a policy change grounded in what happens during actual events.

INTRODUCTION

By some estimates, there are 168 million calls made to 911 from wireless devices each year.[1] With the widespread usage of wireless phones, call centers have experienced a surge in the number of misdialed or silent calls coming into 911, and these calls account for approximately 30% of all calls from wireless devices.[2] The increase of nuisance calls has created a drain on operational resources and poses liability issues for dispatchers who need to figure out which of the calls are nuisances and which have a caller on the other end in need of help.

In recent years the influx of silent and abandoned 911 calls has become a serious problem in call centers across the nation. In a study published by the Department of Justice in 2004 entitled "Misuse and Abuse of 911," the researchers concluded that silent and abandoned calls drain resources and pose a threat to call centers' attempts to maintain proper efficiency.[3] This DoJ study's main objective was to survey the problem of nuisance calls and then offer recommendations for training, education, and possible changes that could reduce the number of nuisance calls. Suggestions included enlisting telecom manufacturers and the FCC to help redesign wireless phones or redevelop the technology to prohibit automatic dialing. They also recommended public education on how misdialed calls affect the 911 system and suggested funneling calls through an automated system. Their main conclusion was that misdialed 911 calls are an industry problem and each department has to develop a protocol that fits their organizational culture and call volume.

A more recent study, titled "San Francisco's 911 Call Volume Increase," found that misdialed calls create additional stress and job dissatisfaction for dispatchers.[4] They reported that 80% of the dispatchers surveyed said the callback procedure for accidental calls was the most time consuming part of their workflow, and 39% indicated that wireless call backs were their biggest pain point in the job. While there were no conclusive recommendations on how to eliminate nuisance calls, the authors highlighted the importance of dispatch supervisors improving employee morale by making changes to CAD systems and monitoring for other pain points in dispatcher work experiences.

While not officially documented, these previous studies suggest that while dispatch centers would be willing to make changes to reduce the flow of nuisance calls, the fact remains that not all dispatch centers have access to the monetary resources necessary to implement the changes. Moreover, and relevant to the current study, there was no discussion of how automated systems or the categorization of nuisance calls would help dispatchers identify the one person that needs life-saving help out of thousands of nuisance calls.

This current study shifts the focus of nuisance call management to the interactional interest of how dispatchers make sense of emergency calls where callers are unable to verbally communicate. In what follows, we examine a small collection of Active Silent calls, where dispatchers interact with a person unable to verbally communicate, and compare those with routine silent calls. Our aim is to identify patterns of silence that can inform dispatchers how to maximize their opportunity for identifying true Active Silent callers. Our findings provide a grounded method for establishing a silent call procedure policy based on actual interactional practices.

METHODS

The research protocol applied to this study is a descriptive, naturalistic method called conversation analysis, which is the science of analyzing talk in natural settings.[5] To help improve dispatchers' communication skills based on actual interaction, this method provides the basis for a training method called Conversation Analytic Role Play Method (CARM).[6] The data includes a collection of 80 hours of recorded calls from a wireless call center in one northeastern state within the United States over the course of a three-month period. Calls included all call types received by dispatchers (e.g., accidents, fires, medical, domestics, drug overdose, etc.) in the routine flow of the workday. Among the calls captured in the collection were silent and abandoned calls, which served as the primary focus for the study. The purpose of collecting the stream of calls was to get a true sense of how dispatchers manage a number of silent and abandoned calls in between calls where callers request police, fire, or ambulance service. For the purpose of this study, we draw from the National Emergency Number Association's differentiation of the call types:[7]

Silent 911: Someone has dialed 911, the call has successfully passed through the 911 network and has been answered by a 911 operator. Aside from the 911 operator's, no voice communication is heard on the initiating caller's end of the emergency call.

Hang-up 911: Someone, either through malicious intent or accidental occurrence, has dialed 911, the call has successfully passed through the emergency network and has been answered by a 911 operator. The initiating caller has hung up prior to the 911 operator answering the call. This type of call is very similar to an abandoned 911 call.

Abandoned 911: Someone has dialed 911 and all available operators are busy. The call is placed into queue for answer. Rather than wait for an available operator, the caller elects to

hang up prior to the 911 call being answered by an available 911 operator. Generally an abandoned call is more often associated with call centers that have an automatic call center distribution call delivery scheme.

Included in this study was a small subset of Active Silent 911 calls. We are defining Active Silent 911 calls as: Someone has intentionally dialed 911, the call has successfully passed through the 911 network and has been answered by an operator. Similar to Silent 911 calls, no voice communication is heard on the initiating caller's end of the emergency call, but this is a live emergency call where the caller is waiting for instructions on how to communicate with the operator.

The region that took part in this study covers nine dispatch centers (of which five are primary Public Safety Answering Points (PSAP)). These PSAPs are dedicated call centers that manage incoming calls for emergency services such as police, fire, or ambulance, and trained telephone dispatchers are responsible for call handling statewide. For the purpose of this study, and as indicated in the analysis below, in order to maintain consistency with the participating PSAPs, we refer to all call handlers as dispatchers. Data collection took place at the largest wireless PSAP, which receives an estimated 800,000 calls per year, of which 33% (292,847 calls/year) are silent or abandoned calls. Our total collection consisted of 1,432 records, which included all incoming calls (accidents, car fires, domestics, suicide, overdose, silence, abandoned, etc.) and outgoing calls (transfers to another dispatch center, trace calls, and others). Abandoned and silent calls made up 33% of this subset of calls, of which 141 were coded as abandoned calls, and 325 were coded as silent. It is current policy that if the caller's number is available, then dispatchers follow up on the abandoned calls and silent calls with a call back. The Active Silent call collection was 4% of this subset. However, we want to emphasize that because of the volume of calls, and the current inconsistency of identifying Active Silent callers, we have no idea how many of these callers were missed.

The participating PSAP for this study incorporates a "Silent Call Procedure" protocol as part of their policy. The protocol states that if the caller does not respond to the dispatcher's outgoing message or subsequent summons for their attention, the dispatcher should initiate the following procedure:
• *If this is an emergency press one*
• *((caller presses 1))*
• *If you need police press 1, fire press 2, ambulance press 3*
• *If there is no response from the caller after asking if this is an emergency, then dispatchers are instructed to initiate TTY for the hard-of-hearing community.*

Once the calls were collected and sorted, silent calls were transcribed forensically and phonetically to capture how talk is spoken. To get an exact calculation of the amount of silence in each case, calls were entered into the ELAN (Eudico Linguistic Annotator) system for psycholinguistics, which marked different temporal points in the data.[8]

Limitations: To address initial limitations, participating dispatchers were those who only managed calls and did not have additional responsibilities such as radio or traffic control, which could account for varying response time to callers. However,

we do note that a limitation is not having a true account for why some dispatchers would allow for more silence after the silent call prompt than others. Some speculation includes that because of call volume, when dispatchers do not have a verbal response from a caller they may treat silence and other background noise (like people talking) as a non-emergency call and move through the process in order to answer the next call in queue. The purpose of our study is to raise awareness about interactional practices with Active Silent callers, thereby encouraging dispatchers to remain alert to silence as a form of communication.

ANALYSIS

Understanding the basic organization of routine 911 calls allows us to document places for dispatchers' and callers' participation in the call, which in turn provides a method to make claims about what participants can expect at each juncture of the call. For example, Extract 1 represents a routine 911 call in which we see the position after the dispatcher's call opening as a place for the caller's request for service (note that extracts are recorded in a method consistent with conversation analysis and that lack of punctuation is intentional and reflects pauses or lack of pauses in speaking):[9]

```
Extract 1
01    DIS:    State Police. Nine one one.
02            This line is recorded. Where
03            is your emergency.
04    CLR:    Hi. I'd like to report an erratic
05            driver.
```

We compared cases like Extract 1 to cases like Extract 2 where the dispatcher's call opening is met with silence:

```
Extract 2
01    DIS:    State Police. Nine one one. This line is recorded.
              Where
02            is your emergency.
03            (1.14)
04    DIS:    State Police.
```

Based on the routine organization and the expectations that the caller will request emergency service in that slot following the call opening, the 1.14 seconds of silence at line 3 can be heard as the caller's silence. The dispatcher then works to solicit the caller's attention with an abbreviated call opening, "State Police" (line 4), and as indicated by the underlining on the transcript, produces his turn a bit louder to get the caller's attention. While this move might seem small and inconsequential, the dispatcher demonstrably shows that he expects the caller to respond to his call opening at this point in the call and can hold the caller accountable for not producing a request (accountable by working to gain the caller's attention). In addition, by soliciting the caller's attention, he treats the initiating caller as someone who can verbally respond with a request for service.

Prompting callers to report their emergency following a silence is not a unique feature of these calls. It is a common practice for dispatchers to work at getting the caller to report their emergency, and they may try a number of methods, including saying "Hello," redoing their call opening, speaking louder, etc. To gain some traction on how dispatchers manage silent calls in practice, we began tracking the methods dispatchers use to gain a caller's attention and how long they wait for a caller to respond before terminating the call. Extracts 3-6 below represent some of these initial call openings:

```
Extract 3
01    DIS:    State Police. Nine one one. This line is recorded.
02            Where is your emergency.
03            (1.14)
04    DIS:    State Police.
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Extract 4
01    DIS:    State Police. Nine one one. This line is recorded.
02            Where is your emergency.
03            (1.33)
04    DIS:    Hello
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Extract 5
01    DIS:    State Police recorded emergency.
02            (1.4)
03    DIS:    Hello State Police recorded emergency?
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Extract 6
01    DIS:    State Police. Nine one one. This line's
02            recorded. Where is your emergency.
03            (2.06)
04    DIS:    State Police Hello?
```

The patterns following the call opening for silent calls were relatively consistent; dispatchers would allow up to 2 seconds for a caller to respond to their initial outgoing message before trying to solicit the caller's attention. In each case, notice that the dispatcher's work to solicit the caller's attention works off the presupposition that the caller is able to verbally respond. We found that dispatchers will make a number of attempts to gain callers' verbal cooperation before moving to the silent call procedure. From the time dispatchers wait for the caller to respond to the initial outgoing message, through the various attempts to get a verbal response, dispatchers allow for a total of 12–15 seconds before they initiate the silent call procedure. The significance of this observation becomes clearer when we examine how long dispatchers allow callers to respond to the silent call procedure prompt.

Initiating the silent call procedure

After several attempts to solicit a verbal response from callers, dispatchers will move to the next phase of the call, where they initiate the silent call procedure. This provides callers who are unable to verbally communicate an opportunity to respond through various prompts as a way of reporting their emergency. Extract 7 is an example of a dispatcher moving from soliciting a verbal response to initiating the silent call procedure.

Extract 7
01   DIS: State Police. Nine one one. This line is recorded.
02   Location of your emergency?
03   (2.25)
04   DIS: Hello Nine one one.
05   (5.28)
06   DIS: Hello if you have an emergency please press one.
07   (1.57)
08   DIS: Testing TTY then.
09   ((TTY playing))
10   DIS: No response. Disconnecting

Following the dispatcher's call opening (lines 1-2), he waits 2.25 seconds (line 3) before trying to solicit the caller's attention by saying, "Hello nine one one." (line 4). After allowing for another 5.28 seconds (line 5) for the caller to respond, the dispatcher initiates the silent call procedure, "Hello if you have an emergency please press one" (line 6). The purpose of the silent call procedure is to provide a slot for the caller to communicate via the keypad on their cellphone. In Extract 7, the caller remains during the 1.57 seconds (line 7) that the dispatcher allows for a response before the dispatcher moves to the next phase of initiating the TTY for the hard-of-hearing community. When the dispatcher activates the TTY, the caller hears a high-pitched sound, which callers may hear as a move toward call closing.

To get a better sense of how much time dispatchers wait for callers' responses to the silent call prompt, we compared how long dispatchers allow for verbal responses as compared to nonverbal responses to the silent call prompt.

Extract 8
01   DIS: State Police. Nine one one. This line is recorded.
02   Location of your emergency.
03   (4.04)
04   DIS: Hello nine one one.
05   (2.98)
06   DIS: If you have an emergency press one.
07   (1.89)
08   DIS: Testing TTY.
09   ((TTY Playing))
10   DIS: No response. Disconnecting

In Extract 8 the dispatcher allows the caller 4.04 seconds (line 3) to verbally respond to the initial call opening. In response to the caller's silence the dispatcher solicits the caller's attention (line 4) and then allows 2.98 seconds for the caller's verbal response. In total, and not including the dispatcher's talk, the dispatcher allows for just over 7 seconds for the caller to verbally respond to his various solicitations for attention. However, after the dispatcher initiates the silent call procedure he only allows 1.89 seconds (line 7) for the caller's nonverbal response before initiating the TTY, which is moving toward call closing.

With preliminary findings suggesting that dispatchers allow more time for callers to verbally respond then they allow for callers to respond to the silent call prompt, we examined actual Active Silent calls where dispatchers were successful in engaging with callers unable to verbally communicate. By analyzing the Active Silent calls,

we were able to document how long, on average, dispatchers allow for callers' nonverbal responses to the silent call prompt.

Extract 9 is a case of an Active Silent call, which begins in a similar way to the cases presented above. That is, after the dispatcher's call opening, the dispatcher allows the caller 1.39 seconds (line 3) to respond before working to gain the caller's attention at line 4, then allowing 4.46 seconds (line 5) for the caller's response. In response to the caller's continued silence, the dispatcher makes two additional attempts (line 6 and line 8), allowing 2.6 seconds (line 7) and 5.85 seconds (line 9), respectively, with no response from the caller. Our focus is on what happens after the dispatcher initiates the silent call procedure at line 10.

Extract 9
01   DIS: State Police. Nine one one. This line is recorded.
02   What is your emergency.
03   (1.39)
04   DIS: State Police. Hello.
05   (4.46)
06   DIS: State Police. Hello.
07   (2.6)
08   DIS: Nine one one.
09   (5.85)
10   DIS: Press one if you have an emergency.
11   (5.01)
12   CLR: ((pressing 1))
13   (4.15)
14   DIS: Press one if you need police.
15   Two fire. Three for ambulance.
16   (2.95)
17   CLR: ((pressing 1))

Unlike the cases examined in our study, this dispatcher waits 5.01 seconds (line 11) for the caller to respond to the silent call prompt. In this case the caller presses the number 1 key (line 12), indicating they have an emergency, after 5.01 seconds.

In his next turn the dispatcher asks what type of emergency service the caller needs and provides three options where the caller can press a number on the keypad to indicate their request (line 14–15). Even with the caller's full attention and engagement with the dispatcher, it took the caller 2.95 seconds (line 16) to respond.

As we began tracking how much time Active Silent callers need to respond to silent call prompts, we found that callers require more time than dispatchers currently allow to locate the correct number on their cellphone during this type of emergency. Moreover, even after dispatchers have made contact with callers, callers still require almost 4 seconds to respond to each prompt. Extract 10 presents a second case of an Active Silent call, tracking how long callers need to respond to the prompts.

Extract 10
01   Dis: State Police. Nine one one. This line
02   is recorded. Where is your emergency.
03   (1.3)
04   Dis: State police.
05   (1.85)

06	Dis:	Hello?
07		(1.41)
08	Dis:	If you have an emergency press one.
09		(4.53)
10	Clr:	((pressing 1))
11		(2.06)
12	Dis:	If you need the police press two.
13		(3.7)
14	Clr:	((pressing 2))

Similar to Extract 9, the dispatcher in Extract 10 makes a number of attempts to gain the caller's attention and get a verbal response. After the silent call prompt (line 8), the dispatcher allows 4.53 seconds (line 9) for the caller's response, which occurs at line 10. As part of the series of questions, the dispatcher inquires as to the type of service needed, beginning with police, and creates options for how the caller should respond by indicating which number on the keypad the caller should press. Again, similar to Extract 9, even with the caller's attention secured, they take 3.7 seconds (line 13) before responding at line 14.

In our examination of the data there was no clear pattern as to why some dispatchers would allow some callers four seconds and others would allow only two. There is speculation that true silence (the complete absence of sound) triggers dispatchers to listen carefully for indications of an emergency situation, thereby allowing for more time after the silent call prompt. However, as indicated above, we are not able to truly account for the variance in silence between dispatchers. Thus, our focus shifted to bringing awareness to the dispatchers about the patterns found in Active Silent calls. After examining the calls in the Active Silence collection, results suggest that Active Silent callers need at least 4 seconds to respond nonverbally to the silent call procedure prompts. Thus, we recommend call centers implement a 4-second rule for dispatchers dealing with silent calls. By playing back actual silent calls and having dispatchers hear how Active Silent callers needed more time to respond to the silent call prompt, we were able to raise awareness to instill a policy change and to change dispatchers' current practices.

CONCLUSION

Current interest in the nuisance call phenomenon focuses on the overall management of call volume and the proper categorization of calls. Dispatch supervisors have become increasingly interested in how the surge of calls affects dispatchers' work performance and what impact these calls have on resources. To alleviate the burden these calls engender, some dispatch centers have taken to automating the silent call procedure so that dispatchers can focus their attention on other calls. The problem, however, is that automated systems are based on a theoretical notion of the interaction that takes place during Active Silent calls. By focusing our attention on actual calls, and calculating how long Active Silent callers need to respond to prompts, we offer empirical results for developing a silent call procedure that can help dispatchers maximize their opportunity to engage with Active Silent callers.

Our recommendation is the "four-second rule," where dispatchers wait 4 seconds following the silent call procedure prompt. While the findings seem small, they are not trivial.

The results of this study have revealed material for future communication skills training and additional research projects that could be consequential for dispatchers' proficiency in silent call management, including the organization of questions and question design suited for interacting through the keypad. A training program based on conversation analytic results helps develop dispatchers' knowledge about how to actually manage the interaction as it happens in real time.

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