The Prosody of Suspects' Responses during Police Interviews

Lorna Fadden

Department of Linguistics Simon Fraser University fadden@sfu.ca

Abstract

This paper reports on the results of a pilot study on the prosody of Western Canadian suspects' speech as it occurs during the course of investigative interviews with police. Suspects' responses are categorized according to the type of information they contain, and the prosodic characteristics of each response type are described. It will be shown in this exploratory study that the various response types pattern consistently across a group of suspects and that it is possible to construct a set of prosodic profiles consisting of pitch range, average pitch, speech rate and hesitation values associated with each response type.

1. Introduction

Interviewing suspects is a primary component of any criminal investigation by police. However, despite the vast amount of work on various types of institutional dialogue, the body of literature on police interviewing remains relatively small. Studies on police interviews vary widely in their approaches and goals, a small selection of which is presented here. [1] describes the police interview as a non-collaborative, "subspecies of information seeking dialogue" (p. 1775). The non-collaborative nature, understandably, results from suspects' disinclination to provide information likely to bring about legal consequence for themselves. In [2], conversation analyses of Australian police interviews demonstrate the process by which information is elicited, and the roles of police and suspects in this institutional setting are described. In a forensic analysis of a single interview, [3] labels question and response types, quantifying them over events and locations for the purpose of determining whether a suspect has genuine guilty knowledge as opposed to police questions and assertions postulating pertinent details of a crime. The authors in [4, 5] identify deceptive speech acts during police interviews, and analyze suspects' pauses and other speech disturbances in addition to a great range of physical gestures. With the exception of pausological analyses noted in [4, 5], prosodic behavior in this unique conversation type thus far has remained largely unstudied. In this paper, I examine the prosody of suspects' speech across a variety of response types to be explained below, on the basis of pitch range, average pitch, speech rate and hesitation.

The primary goal of a police interview is to gather information from a suspect about his or her knowledge of, or involvement in, a criminal act or acts. The pattern of turn taking is driven by the investigator, placing the suspect almost exclusively in a position of responding. Hence, a very simple pattern is repeated throughout the interview: the investigator asks a question intended to elicit pertinent information about an event or entity, or the investigator makes an assertion containing details about an event or entity. Both of these prompts are intended to move the suspect to respond affirmatively, negatively, or to offer further relevant information. Suspect responses to police questions and assertions fall into a relatively small set of categories, four of which I examine in this study. Each is explained below with examples. 'I' indicates investigator, 'S' indicates suspect. Names have been anonymized using small caps.

- **Confirm Information**: The suspect confirms the information contained in the investigator's question or assertion [3]. These responses are often very short, offering no information supplementary to that in the prompt.
 - (a) I: Were you on any drugs at the time?S: Yes.
 - (b) I: Did you get there in the blue car?S: Yes, that's right.
- **Reject Information**: The suspect rejects the information contained in the investigator's question or assertion [3]. Like *confirm information*, these responses tend to be brief, offering no further information.
 - (a) I: Were you trying to kill her?S: No.
 - (b) I: Did you ever think of sexually assaulting her and then not going through with it?S: No, I didn't.
- Offer Information: The suspect responds to the investigator's prompt with directly relevant information. This type of response can vary greatly in length, ranging from a few words to lengthy narratives.¹
 - (a) I: Other drugs, whatever, what other drugs were you on?
 - S: I was on valiums and rivitols.
 - (b) I: Well let me ask you this. How do you think your son's injury occurred?S: God, the only thing that I could have done, biggest thing, would be carrying him and then maybe he hit the electric fan if I fell.
 - (c) I: What's important to me right now, tell me exactly what you did. You saw the woman, take it from there.

¹ Narratives will be examined in a subsequent study.

S: Well, at first I was lookin at her hand right? To see if her keys are there. I was just gonna f***** knock em out right, and take em right? Well, they weren't. And then I was standing back a little bit, I look at her, I'm lookin and I thought I could see the keys on the f***** seat in in in the back right? And she's standin there, and she's not even payin attention to me or nothin and I was kinda like what the f*** man, here's your chance, go! Do it!

- **Irrelevant Information**: The suspect offers information that does not relate to the investigator's prompt. This response type seldom stands alone as a response and instead, is usually embedded inside the *offer information* response type.
 - (a) I: What time did you uh notice the bump on VICTIM's head?

S: (offer information \rightarrow)Ok, um, we got home from taking WITNESS to the hospital at about 1:30, so he was in my care from about 1:30 to say between 4 and 5

I: mm hmm

S: (offer information \rightarrow) He didn't continue feeding. So off we go, and then after I pick her up, we're on our way home, (*irrelevant information* \rightarrow) and I ask her, do you feel like eating anything. And she says Japanese would be nice. Well, ok, to be exact she paused a bit, thought, oh, sushi, Japanese, I thought, ok what's the closest place? Broadway and Hemlock they have a nice eat all you can Japanese so we turn back around, we were already on the way home from Broadway to South East Vancouver. (offer information \rightarrow) Went back there and then what I don't know on the exact time frame is whether we noticed the bump leaving the car going into the Japanese place or noticed the bump leaving the Japanese place after eating and then we discussed ok, should we take him to Dr. WITNESS?

The set of responses defined above is not exhaustive of response types that occur in my corpus, however, these are the categories analyzed in this study. Other suspect response types include confessions, concessions to lesser crimes, pleas of innocence, refusals to respond, lack of recollection or knowledge, and responses that are blends of the above mentioned.

2. The data and methods

The data used to conduct this pilot study were drawn from three interviews with suspects conducted by the Vancouver Police Department between 2003 and 2005. The interviews range in length from 30 minutes to almost four hours. The suspects are all male, ages 27, 30, and 33. All are native speakers of Western Canadian English, and all were under arrest and in police custody at the time of their interviews. The crimes for which they are interviewed are serious: sexual assault (2) and child abuse (1). Each case entails the possibility of significant punishment and therefore, the suspects are in similar high-stakes situations. It is assumed that suspects experiencing greater stress associated with significant punishment will behave differently than those facing a fine or other lesser punitive action.

The data are copied from their original VHS and DVD media onto compact discs in audio format. While the quality of recordings is at best that which is taken at the time of the interview with police department equipment, the CD audio replicas are digitized at 44,100 Hz, and converted into .wav format so that they can be analyzed using Praat v4.2.07 [6].

The quality of the recordings is generally adequate to perform prosodic analysis on, that is, utterances are clearly understood, although for some, reliable pitch values are not always possible either for acoustic reasons or due to speaker overlap. As such, in this data set, four percent of responses were excluded from pitch analyses. For those problematic responses however, speech rate and hesitation length values are still collected for analysis.

The interviews were transcribed and the suspects' turns were coded according to the response categories described above. Table 1 shows the distribution of response types for each suspect.

Table 1.	Distribution	of Responses
Tuble 1.	Distribution	oj Kesponses.

Response Type	Susp I	Susp II	Susp III	Totals
Confirm Info	22	24	19	65
Reject Info	23	21	19	63
Offer Info	22	24	17	63
Irrelevant	20	19	16	55
Info				
Totals	87	88	71	246

Each response was measured for the following prosodic properties:

- speech rate in syllables per second
- hesitation between investigator prompt and suspect response in seconds
- *pitch range*, the peak, in Hz, of each intonation phrase as defined by [7]
- *average pitch*, the average Hz for each intonation phrase as calculated using the pitch average algorithm in [6]

3. Results

The results of each of the prosodic properties by response type are described in the following subsections.

3.1. Speech Rate

The speech rate of suspects' responses was measured for *offer information* and *irrelevant information*. *Confirm* and *reject information* were not measured for speech rate because they are short, often just a 'yeah' or 'no', and therefore a measure of syllables per second was not revealing. Table 2 shows the differences of average speech rates for each suspect.

Table 2: Speech rate in syllables per second.

Suspect	Offer Info	Irrelevant Info
Suspect I	3.74	4.41
Suspect II	2.63	3.92
Suspect III	2.96	4.06

All three suspects tended to speak more rapidly on irrelevant topics than when they were offering relevant information to an investigator's prompt. Significant differences between speech rate values for *offer information* and *irrelevant information* were found for all three suspects: Suspect I, t(40)=2.840, p=.007; Suspect II, t(41)=6.371, p<.0001; Suspect III, t(31)=4.177, p=.0002.

3.2. Hesitation

The span of time between investigators' prompts and suspects' responses was measured in seconds and recorded for *confirm information, reject information* and *offer information*. It was not possible to measure the hesitation of *irrelevant information* because that response type is often embedded inside *offer information*. The lapse of time could range from 0 seconds or less than 0, in the case of turn overlap, to several seconds between turns. The table below shows the range of hesitation duration and the hesitation averages for each suspect.

Table 3: Between-turn hesitation in seconds.

Suspect	Confirm	Reject	Offer
	Info	Info	Info
Suspect I	0.085	0.14	2.04
Suspect II	0.02	0.88	4.06
Suspect III	0.17	-0.02	3.40

All three suspects showed similar hesitation patterns, despite the seemingly wide variation between them by response type. Both *confirm* and *reject information* were preceded by significantly shorter gaps than *offer information*, and in fact, Suspect III's rejecting information often overlapped the investigator's prompt. A one-way between groups ANOVA was carried out for each suspect. All three suspects' hesitation durations differ significantly. Suspect I, F(2, 64)=47.418, p<.0001; Suspect II, F(2, 66)=60.488, p<.0001; Suspect III, F(2, 52)=243.376, p<.0001. Post hoc Tukey tests show that for all three, significant differences occur between *confirm* and *offer information*, and *reject* and *offer information*.

3.3. Pitch Range

In this study, pitch range is taken as the maximum fundamental frequency of each intonation phrase. The degree to which pitch ranges over the intonation phrases of an utterance differs depending on the type of response. The table below shows the averages for each suspect, for each response type.

Table 4: Pitch Range average values in Hz.

Suspect	Confirm Info	Reject Info	Offer Info	Irrel. Info
Suspect I	146	130	140	165
Suspect II	116	109	117	134
Suspect III	95	87	98	115

On the whole, *reject information* showed the lowest pitch range for all three suspects. *Irrelevant information* showed the greatest. A one-way between groups ANOVA was carried out for each suspect's response types. The differences in pitch range for response types are significant for all suspects. Suspect I, F(3, 71)=8.507, p<.0001, Suspect II, F(3, 83)=7.157, p=.0002; Suspect III, F(3,67)=9.294, p<.0001. Post hoc Tukey tests for all three show significant differences between *confirm* and *irrelevant information*, offer and *irrelevant information*, and *reject* and *irrelevant information*. Suspects I and II, show significant differences between *confirm* and *reject information*.

3.4. Average Pitch

The average pitch of each response type was measured using the pitch average algorithm in [6]. The results are reported in Table 5 for each response type.

Table 5: Average Pi	tch	in	Hz.
---------------------	-----	----	-----

Suspect	Confirm Info	Reject Info	Offer Info	Irrel. Info
Suspect I	131	118	120	129
Suspect II	106	99	99	109
Suspect III	92	84	90	97

Of the four prosodic analyses, average pitch displayed the least consistency. A one-way between groups ANOVA was carried out for each suspect. Suspect I's response types showed some significant difference: F(3,71)=4.123, p=.0094, post hoc Tukey tests showing difference only between *irrelevant* and *confirm information*; Suspect II, no significant differences; Suspect III F(3,67)=9.498, p<.0001, and post hoc Tukey tests showed significant differences between *confirm* and *reject information*, *reject* and *offer information*, and *reject* and *irrelevant information*. At best, their averages point to tendencies that *irrelevant information* showed the highest average pitch, *offer* and *confirm* were in the mid range, and *reject information* showed the lowest.

4. Discussion

The prosodic features for each response type are summarized in Table 6, on the basis of averages taken for each response type, pooled over suspects. Fields that remain empty were not analyzed for reasons discussed in sections 3.1 and 3.2. The *** indicates highest values, the **, mid values, and the *, lowest values.

Table 6: Prosodic profiles of responses.

Prosodic feature	Confirm Info	Reject Info	Offer Info	Irrel. Info
Speech Rate			*	***
Hesitation	*	*	***	
Pitch Range	**	*	**	***
Avg Pitch	**	*	**	***

Overall, suspects speak more rapidly when they shift away from topics set by the investigators' prompts with *irrelevant information* showing the highest speech rate. According to [8], speech rate decreases with an increase in discourse planning. Presumably, responses in which suspects are providing on-topic information (*offer information*) require more careful attention so that they reveal less potentially damaging information about themselves or their involvement in an act. Going off-topic shifts the focus away from relevant, and potentially incriminating details, on to safer topics that require less planning.

Findings in [9] point to faster rates of speech when speakers are fearful, and [10] notes the same for states of agitation and uncertainty. It is possible, although at this stage not testable, to propose that suspects shifting to irrelevant topics do so out of nervous tension during questioning.

That suspects hesitate longer before giving a response in which information is offered is not surprising. [8] correlates longer pausing with "higher cognitive load" due to the planning involved in executing the turn. The amount of discourse planning would certainly be higher if the suspect has to plan his turn and provides details, than if the suspect simply confirms or rejects any details contained in the investigator's prompt. As discussed above for speech rate, it is reasonable to assume that a great deal of care goes into deciding what to say when offering information to police for fear of incrimination.

That *confirm information* has a higher pitch range than *reject information* is intriguing. In this set of interviews, when suspects confirm information, it is often less damaging or controversial (see a-c below), and presumably, they are less anxious in their confirmation of it. Examples (d-f) show rejection of information that would cast them in a very negative light. Findings in [11] show that both anxiety and shame are accompanied by lower pitch values, as measured in the *reject information* responses.

Confirm:

- (a) S: And then you went to work? I: That's right.
- (b) S: Did VICTIM call you at any point then? I: Yes she did.
- (c) S: Do you feel that she's making all of this stuff up? I: Yes.
- Reject:
 - (d) S: Let me ask you, did you hit your child? I: No, I did not sir.
 - (e) S: What would be the reason we would find your DNA on those swabs?I: It's not me.
 - (f) S: Do you feel that she was sexually assaulted? I: No, I never touched her.

5. Conclusion

As a preliminary study, the results show much promise with respect to conducting a larger examination of suspects' prosodic behavior within the setting of the police interview. Subsequent work will see an increase in the number of suspects studied, in addition to a wider range of response types, as listed at the end of section 1. I also intend to include more prosodic features, namely articulation rate and within-turn pause duration and frequency.

A description of the prosodic features of suspects' speech during police interviews benefits two fields. First, a study such as this contributes to the prosody and emotion literature, focusing on speakers under duress or in confrontational settings. Second, the results of this study will further the understanding of suspect behavior, a topic of interest to forensic linguists and forensic psychologists. While at this stage, no distinction is made between deceptive responses and truthful responses, the results of this and subsequent studies ought to prove useful in describing the overall linguistic behavior of suspects in this unique setting. A natural next step in this line of research would be to assess the deceptiveness or truthfulness of the response types on the basis of forensic evidence and courtroom testimony. It will then be possible to carry out research comparing truthful and deceptive speech using these, and other, response types.

6. Acknowledgements

I gratefully acknowledge the cooperation of the Vancouver Police Department, in particular Sgt. L. Rankin, Polygraph Section, for providing the data and for his professional insight. I also thank Nancy Hedberg, Dean Mellow, Murray Munro, and Juan Sosa for their valuable comments. This work was supported in part by a SSHRC standard research grant #410-2005-1175.

7. References

- [1] Walton, Douglas, 2003. The interrogation as a type of dialogue. *Journal of Pragmatics* 35, 1771-1802.
- [2] Heydon, Georgina, 2005. The Language of Police Interviewing. New York: Palgrave MacMillan.
- [3] Hill, Martin, 2003. Identifying the source of critical details in confessions. *Forensic Linguistics* 10 (1), 23-61.
- [4] Vrij, Aldert; Mann, Samantha, 2001. Telling and detecting lies in a high-stakes situation: the case of a convicted murderer. *Applied Cognitive Psychology* 15, 187-203.
- [5] Mann, Samantha; Vrij, Aldert; Bull, Ray, 2002. Suspects, lies and videotape: an analysis of authentic high-stake liars. *Law and Human Behaviour*, 26 (3), 365-376.
- [6] Boersema, P. W.; Weenick, D., 1992-2003. Praat Doing Phonetics by Computer version 4.1.12.
- [7] Cruttendon Allan, 1997. Intonation. England: Cambridge University Press.
- [8] Goldman-Eisler, F., 1968. Psycholinguistics: Experiments in Spontaneous Speech. London, New York: Academic Press.
- [9] Sobin, Christina; Alpert, Murray, 1999. Emotion in speech: the acoustic attributes of fear, anger, sadness, and joy. *Journal of Psycholinguistic Research*, 1999, 28 (4), July, 347-365.
- [10] Kerhein, R., 2002. The prosody of authentic emotions. Proceedings of Speech Prosody 2002. Aix-en-Provence, France.
- [11] Banse, R.; Scherer, K.R., 1996. Acoustic profiles in vocal emotion expression. *Journal of Personality and Social Psychology* 70 (3), 614–636.