

What's in a Voice? Vocal Characteristics and Their Influence on Courtroom Decision Making

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ABSTRACT

The proposed study investigated the perceptions of vocal characteristics and their impact on courtroom decision-making. Specifically, pitch and speech rate were examined for their effects on veracity (truthfulness) of a defendant. An actor recorded a testimony from a hit and run case. The computer program Audacity was used to cross-manipulate the levels of pitch and tempo. 125 participants were randomly assigned to one of nine conditions and presented with the defendant's vocal testimony. A computer-based questionnaire was utilized to assess veracity of the defendant, the verdict of the case, and other traits relating to the character of the individual. It was predicted that those who possess lower pitch, and faster rates of speech will be perceived as more truthful, thus less guilty. Though our hypotheses were not supported, there is reason to believe that various parameters contributed to a Type II error.

INTRODUCTION

The founders of the United States of America presented fundamental liberties to which they felt each and every citizen had a right. Among these liberties is the right to a **fair** and speedy trial. Research regarding biases in the process suggests that fair trials may be harder to ensure than the founders may have imagined. One focus of jury research explores juror's perceptions of defendants. Individuals can form attitudes very quickly – often in less than 45 seconds (Kassin, Fein, & Markus, 2008). Consequently, jury members can potentially form extraordinarily quick opinions regarding defendants. The proposed study explores the role of the vocal characteristics of defendants as an influential factor on the decision making process of jurors.

Determining Veracity

One key aspect associated with jurors' appraisals of defendants is the perception of truthfulness. Generally speaking, people believe they can determine whether someone is telling the truth, but in fact most individuals are no better than chance alone. According to Kraut (1980), accuracy, the average ability to tell a truthful or false statement, usually falls around 57%. A similar study carried out by Vrij, Edward, Roberts, and Bull (2000) found a comparable rating of 56.6% accuracy. Given that our judicial system relies on a "jury of our peers", the ability of our peers to be good jurors and ascertain truth is a key issue in the study of juror's processes.

Individuals look to several cues when trying to detect a lie. Research has focused largely on nonverbal cues such as monitoring eye contact, or observing the legs and feet for uncontrollable motions (e.g., Bond, & DePaulo, 2006). However, an insufficient amount of research has been conducted on the role of audition perception, specifically voice characteristics, as an indicator of veracity. Is there something in an individual's voice that cues the "lie detector?" Ko, Judd, & Blair (2006) argue that the voice is a salient characteristic in the formation of stereotypes because it is one of the first cues that perceivers encounter when meeting another individual. Specifically, Ko et al. (2006) found that pitch is a key indicator of stereotype formation.

Research on Vocal Characteristics

Research involving manipulation of vocal characteristics typically involves perceptions of sales and marketing success. Peterson, Cannito, and Brown (1995) explored voice characteristics and selling effectiveness by altering speaking rate, fundamental frequency (pitch), and variability in voice intensity (loudness). They found that lower pitched male voices have more success, especially when they lower their voice at the end of a sentence, as this exhibits authority and credibility (Peterson, Cannito, & Brown, 1995). In contrast, Floyd and Ray (2003) found that larger organisms vocalize with lower pitch, which is indicative of their size and consequently, their potential threat. In a study examining voice characteristics and cooperation rates in telephone surveys, van der Vaart, Ongena,

Hoogendoorn, & Dijkstra (2006) found that pitch, intonation, and fluency, significantly relate to interviewers' approaches. Similar to the results found by Peterson, Cannito, and Brown (1995), lower pitch frequencies were related to authority. Consequently, individuals with lower pitched voices could be rated with a lower veracity rating due to their potential threat. An alternative hypothesis would indicate those individuals with lower pitched voices may be seen as more authoritative and reliable a combination that may predict higher veracity scores. Due to the conflicting research findings, this study will attempt to identify perceptions of lower pitched vocalization.

In terms of the rate of speech, Peterson, Cannito, & Brown (1995) found that salespeople who speak faster exhibit enhanced persuasibility in the context of interpersonal communication, thus yielding higher sales success. Generally speaking, research on rate of speech indicates that fast speech requires listeners to attend more carefully to content; consequently fast speaker are often more persuasive and perceived as more intelligent (e.g. Smith, Brown, Strong, & Rencher, 1975; Woodall and Burgoon). Moore, Adams, Dagenais, & Caffee (2007) had participants listen to multiple stimulus sentences ranging from 90 to 250 words per minute (wpm) in randomized order. Participants then rated stimulus sentences based on a five point Likert scale ranging from 'too slow' to 'too fast' with 'preferred' constituting the middle value. The stimulus sentences that received mean ratings of 2.6 to 3.5 were classified as preferred. The findings indicated that the preferred rate of speech is between 162 and 202 words per minute (2007).

The proposed study focuses on the influence of defendants' vocal characteristics on juror perceptions and verdicts. In particular, this study will examine the vocal characteristics of pitch and speaking rate. In contrast to previous studies, we will focus on the impact of vocal characteristics on perceptions of veracity.

Hypotheses

- Participants will assign a higher veracity rating to the defendant with a low-pitched and fast rate of speech.
- Participants who assign a higher veracity rating to the defendant are more likely to find him not guilty.

METHODS

One hundred and twenty-five undergraduate students were recruited from an introductory Psychology course who are current U.S. citizens and therefore potentially eligible for jury duty. Participants were randomly assigned to one of nine conditions in which they assumed the role of jurors and listened to an audio clip of the defendant's personal testimony, which was recorded by a paid actor. In a preliminary study we assessed preferred levels of pitch and tempo for the narrator to be used in the final study. The results of the study indicated that a 7.5% increase/decrease in pitch and a 10% increase/decrease in tempo was the threshold before the voice sounded non-human; establishing the manipulation ranges for this study.

The nine conditions were manufactured using a computer software program called *Audacity*, which enabled precise control over the levels of manipulation for the variables pitch and tempo. The table below provides an overview of the nine conditions created by combining each pair of vocal characteristics (Figure 1). Once participants listened to one of the nine conditions they completed a questionnaire regarding their perceptions of the defendant. The participants' interpretation of the veracity (truthfulness) of the defendant as well as the level of innocence or guilt was assessed.

Vocal Characteristics				
Pitch ↓	Tempo →	FAST	SLOW	NORMAL
HIGH		A	B	C
LOW		D	E	F
NORMAL		G	H	I

Figure 1. Methods group division

RESULTS

Analyses of the data rejected our initial hypothesis of a lower pitched, faster speaking male voice being perceived as having a higher veracity rating and therefore less guilty. A 2-way between subjects Factorial ANOVA concluded that there was no significant interaction between the independent variables pitch and tempo. There were also no significant main effects found for the independent variable pitch or tempo (See Table 1).

Although non-significant, there was a trend indicating that as pitch increases, participants were less likely to trust the defendant with a secret. Pearson's Chi-Square, $X^2(1) = 2.662, p > .05 (p = .103)$. Also non-significant, was

the finding that as pitch increases participants were also less willing to loan money to the defendant. Pearson’s Chi-Square, $X^2(1) = 0.056$, $p > .05$ ($p = .812$).

Table 1. Pitch and Tempo Interactions and Main Effects

<i>Pitch x Tempo</i>	df	F-value	p-value
Intelligence	4, 116	0.380	0.823
Truthfulness	4, 116	0.451	0.771
Reliability	4, 116	0.158	0.959
Talking Style	4, 116	0.822	0.514
<i>Pitch</i>			
Intelligence	2, 116	0.033	0.967
Truthfulness	2, 116	0.943	0.392
Reliability	2, 116	0.083	0.921
Talking Style	2, 116	1.018	0.364
<i>Tempo</i>			
Intelligence	2, 116	1.063	0.349
Truthfulness	2, 116	0.386	0.680
Reliability	2, 116	1.532	0.220
Talking Style	2, 116	1.079	0.343

DISCUSSION

Results from the study did not support the initial hypotheses of a lower pitched, faster speaking male voice being perceived as having a higher veracity rating and lower ratings of guilt. However, this does not indicate that vocal characteristics do not play a role in decision-making. Rather, this study’s results could be the effect of a Type II error, given that 79% of all participants, regardless of vocal condition, assigned a verdict of not guilty to the defendant. Furthermore, there are several other factors that may have contributed to this potential Type II error including: severity of the offense, pitch and tempo variation ranges, sex of the speaker, and the demographics of the sample.

Perhaps the primary factor in lack of significant differences between different vocal characteristics groups was the ambiguous statement given by the defendant. In the preliminary research leading up to this study, as well as consultation with colleagues, the decision to use a statement from a non-polarizing crime was essential (Polley, 1984). This was done to ensure that the verdict assigned to the defendant was not the result of a stigmatized crime, such as murder, but rather, was the result of the veracity of the defendant. A hit and run offense was used due to the participants’ ability to identify with the defendant. The particular statement used in this study was also selected because it lacked sufficient evidence for a concrete verdict for the defendant. Further research could more closely examine the levels of guilt associated with particular criminal statements on an array of offenses. For example, future studies could examine levels of guilt associated with particular criminal statements. If a statement were found to have moderately equal distribution of both guilty and non-guilty verdicts that statement would potentially ensure that vocal characteristics contribute to perceptions of the defendant.

Pitch and tempo variation may have also contributed to the likelihood of a Type II Error. Due to the lack of research in vocal perceptions, a pilot study was conducted to more closely examine the effects of manipulations of pitch and tempo. After summarizing the data from this pilot experiment, it was determined that the levels of pitch and tempo used in this study would give the greatest likelihood for finding differences between groups while still resembling a human voice. (When pitch was manipulated to +/- 15% we found that the voice sounded mechanical and lacked human quality.)

Further research may investigate the variation in both pitch and tempo to determine the point at which differences in verdicts assigned to the defendant vary. Additional piloting could be conducted to give a more precise

level of optimal manipulation for both variables. Lastly, additional studies could also examine other vocal characteristics that may play a role in perceptions such as inflection or volume of the speaker.

In addition to a manipulated statement it may also be beneficial to present participants with a control. For example, a statement by the prosecution could be used as a baseline, while still manipulating the vocal characteristics of the defendant's testimony. This would allow the participants to have a reference point potentially amplifying the effects of the vocal manipulation.

In accordance with general incarceration rate in the United States, a male speaker was used in this study to more closely represent criminal demographics in the United States. However, it is likely that with this particular crime and vocal manipulation we could have found similar results with a female narrator. It is not out of the question that a female voice (especially with a hit and run) may have shifted levels of guilt as well as overall veracity.

The demographics of this study also may have contributed to the insignificant findings. As with most research conducted in a university setting, the majority of this sample consisted of 18 or 19 year old Caucasian females. Also, students in a higher-level, liberal based learning atmosphere tend to be more open-minded and perhaps are more forgiving when it comes to crime. Also these individuals potentially have less exposure to the criminal justices system, particularly with its practices and procedures when it comes to charging crimes.

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