

Surgical outcomes research

Surgeons' tone of voice: A clue to malpractice history

Nalini Ambady, PhD, Debi LaPlante, MA, Thai Nguyen, BA, Robert Rosenthal, PhD, Nigel Chaumeton, PhD, and Wendy Levinson, MD, Boston, Mass, Riverside, Calif, and Toronto, Ontario, Canada

Background. *Interpersonal aspects of care, such as the communication behaviors of physicians, are often cited as central to patients' decisions to initiate malpractice litigation. Relatively little is known, however, about the impact of the communication behaviors of surgeons. In the current study, we investigated the relationship between judgments of surgeons' voice tone and their malpractice claims history.*

Methods. *We examined the relationship between surgeons' voice tone during routine office visits and their history of malpractice claims. Surgeons were audiotaped while speaking to their patients during office visits, and very brief samples of the conversations were rated by coders blind to surgeons' claims status. Two 10-second clips were extracted for each surgeon from the first and last minute of their interactions with 2 different patients. Several variables were rated that assessed warmth, hostility, dominance, and anxiety from 10-second voice clips with content and 10-second voice clips with just voice tone.*

Results. *Controlling for content, ratings of higher dominance and lower concern/anxiety in their voice tones significantly identified surgeons with previous claims compared with those who had no claims (odds ratio [OR] 2.74, 95% confidence interval [CI] 1.16 to 6.43 for dominance; OR 0.46, 95% CI 0.21 to 1.01 for concern/anxiety).*

Conclusions. *Surgeons' tone of voice in routine visits is associated with malpractice claims history. This is the first study to show clear associations between communication and malpractice in surgeons. Specific types of affect associated with claims can be judged from brief audio clips, suggesting that this method might be useful in training surgeons. (Surgery 2002;132:5-9.)*

From the Department of Psychology, Harvard University, Boston, Mass; Department of Psychology, University of California-Riverside, Riverside, Calif; Legacy Good Samaritan Hospital, Portland, Ore; and University of Toronto, Toronto, Ontario, Canada

MALPRACTICE LITIGATION is associated not only with physician negligence and error^{1,2} but also with the quality of communication between physicians and patients. Indeed, the quality of care is neither the primary nor the only reason cited by patients as a motivation for taking legal action. Rather, the decision to sue a physician is on the basis of a combination of complaints about the doctor's competence and the interpersonal aspects of care.³⁻⁵

Supported by the Agency for Health Care Policy Research, Grant No. RO1 HS07289, the Bayer Institute for Health Communication, and the National Science Foundation Presidential Early Career Award for Scientists and Engineers (SBR 9733706).

Accepted for publication March 11, 2002.

Reprint requests: Nalini Ambady, Department of Psychology, 1420 William James Hall, Harvard University, Cambridge, MA 02138.

Copyright 2002, Mosby, Inc. All rights reserved.

0039-6060/2002/\$35.00 + 0 11/60/124733

doi:10.1067/msy.2002.124733

Some specific communicative behaviors of physicians are associated with malpractice claims. Levinson et al⁵ found significant differences between communication patterns of primary care physicians who had previous malpractice claims filed against them and those who had no previous claims. Primary care physicians who had no previous claims filed against them were more likely to conduct significantly longer visits, solicit patients' opinions, and use humor than were primary care physicians with claims. Other studies have identified similar behaviors in obstetricians and gynecologists.⁴ But no previous studies have demonstrated significant relationships between communication and malpractice in surgeons, who are more likely to be sued than other specialists. Moreover, previous studies have focused exclusively on the content of communication and have not examined the tone of voice of conversations.

The manner or tone in which a physician communicates might be as important to malpractice as

what is said. A physician relating to a patient in a “negative” manner (eg, using a harsh or impatient tone of voice) may trigger litigious feelings when there is a bad result, whereas a physician relating in a “positive” manner may not.⁶ Because the medical encounter is often emotionally stressful, patients may be especially sensitive to the emotion communicated by subtle cues such as the tone of voice. Extensive research on communication outside of medicine demonstrates that the voice tone of the speaker can predict important interaction outcomes. Voice plays a role in personality and emotional judgments,⁷ comprehension,⁸ retention,⁹ and, even, persuasion.^{10,11} In the field of education, ratings of teachers’ voice tones can predict important educational outcomes, such as student evaluations.¹² In medicine, limited research suggests that ratings of brief segments of physicians’ speech might communicate unexpectedly rich information related to important medical outcomes, such as patient satisfaction.¹³⁻¹⁵

Thus, the goal of the current study was to examine whether ratings of surgeons’ tone of voice are associated with malpractice claims history. The study uses research methods that are well accepted in other fields of communication and applies them to understanding surgeon-patient communication.

METHODS

Overview. The study used 114 conversations recorded during routine medical visits between patients and community-practicing surgeons. Half of the surgeons had previous malpractice claims and half had never experienced a claim. Brief 10-second segments of the tapes were extracted and coded for tone of voice. Logistic regressions were performed to examine the contribution of voice tone, beyond the content of speech, to predicting malpractice claims history.

Participants

Physicians. Sixty-five surgeons (orthopedic and general surgeons) were included in this sample. They were audiotaped during routine medical visits in Denver, Colo, and Portland or Salem, Ore, for a study by Levinson et al.⁵ “Claims surgeons” had 2 or more claims filed against them during their practice lifetime, and “no-claims surgeons” had never been filed against. A claim was defined as “any patient request for funds, any malpractice suit filed by a patient, or any contact by an attorney who represented a patient in an action against the physician.”

All participating surgeons consented to the audiotaping. Additional details on demographics, recruitment, and specific data collection techniques are provided in Levinson et al.⁵ The original

Levinson et al study was approved by the Institutional Review Board of Legacy Good Samaritan Hospital of Portland, Ore.

Patients. Two patient visits were selected per surgeon. Patients were eligible if they were at least 18 years of age, spoke English, and were not in severe distress. Patients were recruited from the surgeons’ waiting rooms, and written consent to the audiotaping was obtained from each participant. Most patients had some college education (63%), with a mean annual family income of about \$28,000. The median age was 51 years old and 45% were male. All patient visits with a surgeon, other than those for a procedure only (eg, suture removal), were included.

To ensure the widest range of behavior possible, the patient with the highest satisfaction score and the patient with the lowest satisfaction score for each of the 65 surgeons (an average of 10 patient visits was recorded per surgeon), on the basis of their self-reports of satisfaction, were selected for the current study. Eight tapes were excluded because of poor tape quality, heavily skewed conversations in which the patient said little, or because another person talked for the patient. Thus, data from 57 surgeons and 114 patients were used in the current study. Thirty-six surgeons had previous malpractice claims.

Stimulus materials

Surgeon clips. Two 10-second clips of surgeon speech were extracted from the first and last minute of the visit of the 114 audiotaped surgeon-patient interactions. These intervals were chosen because the opening comments are important in establishing the tone of communication,¹⁵ and the last minute can leave a lasting impact on the patient.¹⁶

All the 228 clips (4 clips per surgeon) were made by one of the authors (T. N.), who was blind to the claim history and the characteristics of both the surgeons and the patients. For the first clip, a 1-minute segment was recorded as soon as the surgeon entered the room and began speaking with the patient. If it was possible to find 10 continuous seconds during which only the surgeon was speaking, then the clip was made from those 10 seconds. Otherwise, segments of speech from the first minute were spliced together to produce a total of 10 seconds of surgeon-only speech. The same procedures were followed to extract the second set of clips from the last minute of the visit.

Tapes. The order of the 2 clips (first minute and last minute) taken from each taped interaction was randomized. Each clip was preceded by an identifying number and followed by a 20-second rating pause. These clips were content-filtered to remove the content of the messages.¹³ Content filtering is

the process of passing the audiotape on which the conversation was recorded through a filter modifier, which filters out the high-frequency sounds on which word recognition depends. Thus, after content filtering only expressive features, such as intonation, speed, pitch, and rhythm, remained.

Rating procedures. Judges were 12 (6 men, 6 women) Harvard University undergraduates, ranging in age from 18 to 22 years old. Half the judges rated clips with content (called "brief content") and half rated voice-tone-only clips (called "brief voice tone"). They were fully informed about the nature of the study before beginning and were paid for their participation. Before rating the tapes, judges rated 20 sample clips (using voices from a different study) on the variables further described to familiarize themselves with the stimuli and the task. As in previous studies using similar judgment tasks, judges were not given any further training or any feedback regarding their performance.^{6,7,13,14,17}

Each clip was rated for the following variables on a 7-point scale, ranging from "not at all" to "extremely": warm, anxious/concerned, interested, hostile, sympathetic, professional, competent, dominant, satisfied, and genuine. These variables were selected because they have high face validity in the physician-patient context, have been used in a variety of studies of non-verbal communication among physicians, and have been found to reliably index emotion in interpersonal communication.¹²⁻¹⁵ In particular, 2 different meta-analyses of over 60 studies examining communication, as judged from brief samples of behavior, indicate the diagnosticity of these variables in organizational, healthcare, and educational settings.¹²

Statistical analyses. Before the regression analysis, judges' ratings for the brief clips were subjected to a principal components analysis using varimax rotation to reduce the number of variables. Principal components analysis suggested a final total of 4 variables: (1) warm/professional, (2) concerned/anxious, (3) hostile, and (4) dominant.

This result falls in line with previous work examining medical interactions using voice tones that suggests concern/anxiety, hostility, and dominance should be examined separately.^{13,14} Concern and anxiety sound similar to one another in tone of voice and hence are scored together. Because hostility demonstrated the lowest reliability (r), and correlated highly with anxiety (brief content $r = 0.72$; brief voice tone $r = 0.83$), this variable was dropped from the analysis.¹⁸

RESULTS

Surgeon demographics. Of the 57 surgeons, 23 were general surgeons and 34 were orthopedic sur-

geons. The median number of years since medical school graduation was 15.5, ranging from 12 to 41 years. The mean self-reported number of hours with patients per week was 58, with a range of 18 to 76 hours. More than half the surgeons were in single-specialty groups, a few were in multispecialty groups, and the rest were in solo practice. Except for 2 African-American men and 1 Native-American man, all the surgeons were Caucasian. One Caucasian surgeon was female.

Reliability. Interjudge r or the agreement among the judges was computed, and the median r was 0.54, similar to that found in other studies examining vocal tone.¹²⁻¹⁵

Variables. Because the goal of the study was to assess effects of voice tone without content, we controlled for content in 2 ways. Previous work has shown that the best way to examine voice tone is to eliminate content.^{13,14,19} We used 2 methods to control for content: (1) controlling for existing previously coded content variables from the entire audiotapes (referred to as "full content") and (2) controlling for brief content variables from the short 10-second clips (referred to as "brief content"). These 2 approaches permit the retaining of information associated with voice tone alone after taking away content. Including both full-content and brief-content variables in the regression analysis is better than using one alone, because both sets of variables contribute independently to eliminating the effects of content of speech.

The full-content variables used in the regression were on the basis of the earlier work of Levinson et al.⁵ In that study, 4 content variables were related to malpractice claims history of physicians: surgeon facilitation, patient laughter, criticism of a third party, and surgeon empathy. These variables were combined into a "full-content" composite and were then included in our regressions, to control for the influence of content on judgments.

Logistic regressions. The final logistic regressions include: (1) the full-content⁵ variables used in the earlier study, (2) the 3 brief-content variables (warm/professional, concern/anxiety, dominance), and (3) the 3 brief-voice-tone variables (warm/professional, concern/anxiety, dominance).

Surgeons. Controlling for the full and brief vocal content variables, surgeons who were judged to be more dominant (OR 2.74, $P = .02$, 95% CI 1.16 to 6.43) and less concerned/anxious on the basis of their tone of voice (OR 0.46, $P = .05$, 95% CI 0.21 to 1.01) were more likely to have been sued than surgeons who were judged to be less dominant and more concerned/anxious (Table). The results did not vary according to the specialty of the

Table. Surgeons: logistic regression model for a history of 2 or more claims for voice tone variables

<i>Variable</i>	<i>P value</i>	<i>Partial correlation</i>	<i>Odds ratio (95% CI)</i>	<i>CI</i>
Full content	.7	0.04	1.03	0.87-1.23
Brief content				
Warm/professional	.34	0.09	0.65	0.26-1.59
Concern/anxiety	.24	0.11	0.53	0.18-1.53
Dominance	.04	0.20	2.39	1.06-5.40
Brief tone				
Warm/professional	.89	0.01	1.13	0.18-7.01
Concern/anxiety	.05	0.18	0.46	0.21-1.01
Dominance	.02	0.22	2.74	1.16-6.43

114 clips, 57 surgeons. *CI*, Confidence intervals.

surgeon (orthopedic vs general), and the relationship between dominance and claims status did not vary by surgeon specialty ($P = .32$).

DISCUSSION

Ratings of surgeons' tone of voice from very brief segments (four 10-second clips) of audiotaped conversations were associated with the previous malpractice claims of surgeons, after controlling for vocal content. Thus, 40 seconds of surgeons' speech distinguished between claims and no-claims surgeons, revealing the power of the information communicated by the voice. These findings suggest that, in the medical encounter, "how" a message is conveyed may be as important as "what" is said. Specifically we found that both for general and orthopedic surgeons, those who were judged to be more dominant were more likely to have been sued than those who sounded less dominant. The current findings are novel in that they show that speech and voice tone alone, judged from mere 40-second slices of speech, can distinguish between claims and no-claims surgeons. These results underscore the potency of vocal communication in medical interaction.

Dominance in voice tone is conveyed in deep, loud, moderately fast, unaccented, and clearly articulated speech.^{11,19} Expressions of dominance may communicate a lack of empathy and understanding for the patient. On the other hand, concern or anxiety in the voice is often positively related to expressing concern and empathy.¹²⁻¹⁴

Our study findings imply that even very brief exposure to a surgeon's speech may be perceived by patients as expressing dominance and lacking concern. Dominance coupled with a lack of anxiety in the voice may imply surgeon indifference and lead a patient to launch a malpractice suit when poor outcomes occur. Because Levinson et al⁵ did not find specific communication behaviors associated with malpractice in surgeons, it is possible that a global perception on the basis of vocal cues in

surgeons' interactions is more important than the content of the dialogue.

Qualities of the surgeon-patient relationship may explain the relationship between vocal cues of surgeons' dominance and claims history. Surgeons often see patients who are referred to them for surgical intervention; thus they face unique challenges such as discussing complicated technical procedures that are perplexing to the nonmedically trained.²⁰ This may act as a barrier to effective communication and perhaps increase the power imbalance between the surgeon and the patient,²¹ so that patients are particularly sensitive to displays of dominance. Additionally, greater levels of counseling and education characterize surgeon-patient relations. One study reports that 90% of the content of utterances in surgeon-patient relations pertained directly to the patients' medical conditions or therapies.²² Because the surgeon-patient encounter is characterized more by technical explanations, there may be a greater opportunity for surgical patients to perceive dominance.

Our results have potential implications for the selection, training, and continuing education of surgeons, as there is little literature that specifically examines surgeon-patient relations or that provides guidance for how to improve their communication. An effective training method might be to use audiotaped interactions for feedback and to provide surgeons with a sense of how they sound during interactions. This exposure would facilitate an enhanced awareness and sensitivity to the manner in which one speaks. Feedback about communication could be combined with instruction about malpractice prevention and positive health outcomes.

Previous research suggests that communication skills training enhances physicians' communication skills. However, teaching surgeons communication skills and tone of voice has not been the focus of previous studies. One limitation of this study is that the postdictive nature of the findings render it impossible to deny the possibility that

tone of voice that characterized surgeons with malpractice claims were a result of, rather than a cause of, claims. Nevertheless, it is not likely that surgeons change their tone of voice in response to malpractice claims, especially in the direction of sounding more dominant and less concerned after being claimed against.

In summary, this study adds to the burgeoning evidence linking physician-patient communication to important outcomes such as patient dissatisfaction, surgeon shopping, poor adherence to medical directions, and poor health outcomes.^{3-6,13,14,23-26,28} It suggests new information that tone of voice rather than just content of communication may be related to surgical malpractice. Further, it adds to a small but growing body of research regarding specific communication between surgeons and their patients. But this study also suggests that the surgeon communicates a wealth of information by means of minimal cues that can have important consequences. These data suggest that surgeons' tone of voice in communication might be one key factor in providing satisfactory care and in avoiding lawsuits.

REFERENCES

1. Hilfiker D. Facing our mistakes. *N Engl J Med* 1984;310:118-22.
2. Leape LL. Error in Medicine. *JAMA* 1994;272:1851-7.
3. Beckman HB, Markakis KM, Suchman AL, Frankel RM. The doctor patient relationship and malpractice—lessons from plaintiff depositions. *Arch Intern Med* 1994;154:1365-70.
4. Hickson GB, Clayton EW, Entman SS, Miller CS, Githens PB, Whetten Goldstein K, et al. Obstetricians' prior malpractice experience and patients' satisfaction with care. *JAMA* 1994;272:1583-7.
5. Levinson W, Roter DL, Mullooly JP, Dull VT, Frankel RM. Physician-patient communication: the relationship with malpractice claims among primary care physicians and surgeons. *JAMA* 1997;277:553-9.
6. Lester GW, Smith SG. Listening and talking to patients: a remedy for malpractice suits? *West J Med* 1993;158:268-72.
7. Berry DS. Accuracy in social perception: contributions of facial and vocal information. *J Pers Soc Psychol* 1991;61:298-307.
8. Glasgow GM. A semantic index of vocal pitch. *Speech Monogr* 1952;19:64-8.
9. Wolbert C. The effects of various modes of public reading. *J Appl Psych* 1920;4:162-85.
10. Mehrabian A, Williams M. Nonverbal concomitants of perceived and intended persuasiveness. *J Pers Soc Psych* 1969;13:37-58.
11. Burgoon JK, Birk T, Pfau M. Nonverbal behaviors, persuasion, and credibility. *Hum Commun Res* 1990;17:140-69.
12. Ambady N, Bernieri F, Richeson JA. Towards a history of social behavior: judgmental accuracy from thin slices of behavior. In: Zanna MP, editor. *Advances in experimental social psychology*. San Diego: Academic Press; 2000. p. 201-71.
13. Milroe, S, Rosenthal, R, Blane, HT, Chafetz, ME, Wolf, E. The doctor's voice: postdictor of successful referral of alcoholic patients. *J Abnorm Psych*; 1967;72:78-84.
14. Blanck PD, Rosenthal R, Vannicelli M. Talking to and about patients: the therapist's tone of voice. In: Blanck PD, Buck R, Rosenthal R, editors. *Nonverbal Communication in the Clinical Context*. University Park (PA): The Pennsylvania State University Press; 1986.
15. Pittinger RE, Hockett CF, Danehy JJ. *The First Five Minutes*. Ithaca (NY): Matineau Press; 1960.
16. White J, Levinson W, Roter D. "Oh, by the way...." The closing moments of the medical visit. *J Gen Intern Med* 1994;9:24-8.
17. Rosenthal, R. *Judgment Studies: Design, Analysis, and Meta-analysis*. Cambridge (MA): Cambridge University Press; 1987.
18. Campbell DT, Kenny DA. *A Primer on Regression Artifacts*. New York: Guilford Press; 1999.
19. Knapp ML, Hall JA. *Nonverbal Communication in Human Interaction*. Orlando: Holt, Rinehart, and Winston; 1997.
20. Levinson W, Chaumeton N. Communication between surgeons and patients in routine office visits. *Surgery* 1999; 125:1-8.
21. Wertheimer MD, Berman SL, Wheeler HB, Siegal I. Ethics and communication in the surgeon-patient relationship. *J Med Educ* 1985;60:804-6.
22. Sanson-Fisher RW, Poole, AD. Training medical students to empathize: an experimental study. *Med J Aust* 1978;1:473-6.
23. Bowman FM, Goldberg D, Millar T, Gask L, McGrath G. Improving the skills of general practitioners: the long-term benefits of group teaching. *Med Educ* 1992;26:63-8.
24. Bensing J. Doctor-patient communication and the quality of care. *Soc Sci Med* 1991;32:1301-10.
25. Ben-Sira Z. Affective and instrumental components in the physician-patient relationship: an additional dimension of interaction theory. *J Health Soc Behav* 1980;21:170-80.
26. DiMatteo MR, Hays RD, Prince LM. Relationship of physicians' nonverbal communication skill to patient satisfaction, appointment compliance, and physician workload. *Health Psychol* 1986;5:581-94.
27. Lepper HS, Martin LR, DiMatteo R. A model of nonverbal exchange in physician patient expectations for patient involvement. *J Nonverbal Behav* 1995;19:207-22.
28. Woolley FR, Kane RL, Hughes CC, Wright DD. The effects of doctor-patient communication on satisfaction and outcome of care. *Soc Sci Med* 1978;12:123-8.