

Acoustic Distinctions in the Speech of Male Psychopaths

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A key feature of psychopathy is the ability to deceive, manipulate, and con the unwary, while seeming to be perfectly sincere. Is this impression of sincerity achieved solely through body gestures and facial expression, or is there also something different about the voice quality of psychopaths? We analyzed the acoustic characteristics of speech in 20 male offenders (10 psychopaths and 10 nonpsychopaths), assessed with the Psychopathy Checklist—Revised (Hare, 1991). We used a computer program developed by Alpert, Merewether, Homel, Martz, and Lomask (1986) to measure variations in amplitude and prosody. Results indicated that psychopaths spoke more quietly than controls and did not differentiate, in voice emphasis, between neutral and affective words. These findings are consistent with the developing view that psychopaths are insensitive to the emotional connotations of language. In addition, their vocal characteristics may be part of a self-presentation mode designed to manipulate and control interpersonal interactions.

INTRODUCTION

Untruthfulness is an integral symptom of the psychopathic personality, one of the few criteria of psychopathy that all diagnostic systems include (American Psychiatric Association, 1994; Cleckley, 1976; Hare, 1991). Lying is

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obviously not a characteristic associated solely with psychopaths, but this group often manages to be extraordinarily successful at deception. Though the process by which psychopaths achieve this success is often the subject of conjecture, the mechanism is as yet unknown.

In order to lie at least competently, it would seem advantageous to avoid displaying affective arousal, to mask one's emotional reactions. Some would-be liars are hampered by telltale signs of emotion when they attempt deceit, perhaps because of the knowledge that they do not mean what they are saying, or they anticipate being caught. It has been suggested, however, that psychopaths have very little emotional investment in the words they use. Williamson, Harpur and Hare (1991) presented subjects with letter strings consisting of affective and neutral words and nonwords. Nonpsychopaths could distinguish emotional words from nonwords very efficiently, apparently by utilizing the affective content to facilitate their cognitive processes; psychopaths failed to show this effect. This lack of emotional investment frees psychopaths to talk in cavalier fashion about themes of love and trust, "pulling the words from their overcoat pocket" (Peguy, 1943, cited by Hare, 1993, p. 124), rather than appreciating their affective significance. It is not clear whether this extends beyond affects to connotations in general but psychopaths fail to respond to extra semantic aspects of words.

Cleckley (1976) proposed that psychopaths suffer from a deep-seated semantic disorder in which the affective and semantic components of words are dissociated. Others have made similar observations. Grant (1977) considered psychopaths to know "only the book meaning of words" (p. 50), and Gillstrom and Hare (1988) suggested that emotion is "like a second language to the psychopath" (p. 25). Hare and McPherson (1984) hypothesized that a possible explanation for abnormal linguistic processing in psychopaths could be reduced hemispheric lateralization. Normally, there is a strong right-ear advantage for recalling linguistic material presented dichotically. In the Hare and McPherson study, this pattern emerged strongly for nonpsychopaths, but was missing in psychopaths. Others, also, have confirmed these lateralization differences, including Raine, O'Brien, Smiley, Scerbo, & Chan (1990), and Day and Wong (1996), who concluded that, for normals the right hemisphere generally plays a central role in emotion, but the psychopathic brain does not show this hemispheric dominance. No consistent evidence has been found for other neuropsychological or intellectual differences between psychopaths and nonpsychopaths.

These findings suggest that psychopathy involves a subtle deficit in emotional/linguistic processing. It follows that psychopaths should appear cold and unemotional, yet they are more typically seen as sincere, verbally persuasive, charming, articulate, and even eloquent. What is the source of their charm? Nonverbal behavior has been studied in the search for an an-

swer. Nonverbal communication includes a variety of behaviors such as facial expression, gesture, and vocal acoustics. Rime, Bouvy, and Rouillon (1978) found that psychopaths tended to intrude into the interviewer's personal space by leaning forward and by making prolonged eye contact. Since eye contact is generally considered antithetical to untruthfulness, this communication device may be a part of their technical repertoire, designed to convince others of their trustworthiness. Gillstrom and Hare (1988) analyzed hand gestures during videotaped interviews of 115 male inmates, and found that subjects high in psychopathy used significantly more "beats," defined as language-related gestures that do not reflect the semantic content of speech. Increased use of hand gestures may, as Gillstrom and Hare concluded, reflect differences in central language processing of psychopaths. An alternative—or parallel—explanation is that these gestures may represent learned patterns, techniques which are used to engage their listeners and provide a distraction from the content of their speech.

In this study, we sought to further delineate the source of the psychopath's power to manipulate, to charm, and to lie so successfully, by analyzing the acoustic characteristics of speech. By concentrating on the vocal aspect of nonverbal communication, we are implicitly assuming that acoustic characteristics are as important as—and perhaps more important than—the content. There is a long tradition supporting this view of communication, and more recently Feldstein and Welkowitz (1987) noted that conversation patterns are frequently used "as a form of interpersonal contact in which participants attend primarily to the sound of each others' voices and minimally to the words that are uttered" (p. 452)

Acoustic analysis has been successfully used to distinguish the blunted speech of schizophrenics (Alpert & Anderson, 1977) and the faster syllable and word production rate of manics (Merewether & Alpert, 1990). We used a wide variety of verbal material in order to gauge the effect of dyadic conversational-style speech, monologue, and material of differing affective valence. We were interested in amplitude since it seemed plausible that this aspect of speech may change with the affective significance of the words being spoken. Since emotionality is putatively deficient (or at least qualitatively different) for psychopaths, we hypothesized that this variable would show a different pattern in psychopaths than in nonpsychopaths when the material being discussed is normally considered to be emotionally significant.

METHOD

Participants

Subjects were 20 male inmates of a medium-security correctional institution in British Columbia. They had volunteered to participate in several

research projects and provided informed consent and gave permission to inspect their institutional files. They were paid \$10 for their participation. Before audiotaping their voices for analysis, each subject participated in a videotaped, semistructured diagnostic interview. Two investigators independently used information collected during the interview and from institutional files to rate each inmate using the Psychopathy Checklist—Revised (PCL-R; Hare, 1991). PCL-R scores are highly reliable and valid in criminal populations (Hare, 1991; Hare et al., 1990); The PCL-R consists of two stable, correlated factors (Harpur, Hakstian, & Hare, 1988). While the factors themselves are correlated about .5, they have different external correlates. Factor 1 reflects interpersonal and affective characteristics considered fundamental to the clinical conception of psychopathy, while Factor 2 reflects a socially deviant lifestyle. The PCL-R contains 20 items in total, each scored on a 3-point scale (0, 1, 2) according to the extent to which it characterizes the subject; total scores can range from 0 to 40. For research purposes, 30 has been a useful cutoff point for diagnosing psychopathy although subjects scoring 27 and higher generally exhibit many of the psychopathic characteristics associated with the higher scores.

In order to be included in the present study, inmates were required to speak English as a first language. Volunteers meeting this condition were divided into two groups on the basis of their PCL-R score: group P (psychopathic) scored between 27 and 40 ($M = 30.3$) and group NP (nonpsychopathic) below 27 ($M = 21.5$). The mean age of subjects was 32 years (range = 20 to 53), and mean grade level obtained was Grade 10 (range = Grade 8 to 4 years of university). Group differences in age and education were not significant.

Procedures

Each subject participated in two separate sessions. Session 1 consisted of a videotaped diagnostic interview for psychopathy assessment, followed by administration of the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and verbal subtests (Verbal IQ scale) from the Wechsler Adult Intelligence Scale—Revised (WAIS-R; Wechsler, 1981). The second session consisted of an audiotaped interview for the purpose of acoustic analysis of speech.

Procedures for acoustic analysis: Subject and interviewer, both wearing unidirectional microphones, were recorded onto analogue tapes using a professional quality cassette deck with separate, parallel channels. Distance between subject and interviewer was kept at a constant 1 m across all subjects. Data collection procedures consisted of seven parts: the first three were automatic speech samples (counting, pronouncing vowel sounds, reading a

paragraph) to provide baseline data and familiarization trials, and the last four were designed to provide a variety of affective material which was neutrally, positively, and negatively valenced.

The first of these four was a semistructured interview during which interviewer and subject discussed bland topics such as sports, prison activities, and hobbies. This task was designed to provide voice samples of affectively neutral material. The second and third tasks consisted of emotional recall, where subjects were asked to recall their most positive and their most negative experience, providing a monologue of at least 5 min on each topic. The order of recall was counterbalanced. The fourth task was a series of 16 sentences, eight containing a negatively valenced and eight a positively valenced word. Words were selected from the Toronto Word Pool (Friendly & Franklin, 1982). Word order was counterbalanced across both conditions (negative and positive) and mean sentence length was approximately equal for both conditions.

Recording levels were checked by asking subjects to read the date, and gain levels were set to peak around 0 dB. The gain level was noted for each subject, and remained untouched for the entire session. After the recording, calibration tones at 100 and 300 Hz at 100 mV were recorded onto the tape. During analysis subjects' voice levels and fundamental frequencies were calculated with the calibration tone as reference.

PCL-R ratings were conducted by one pair of researchers, and audiotaped interviews for the purpose of acoustic analysis were conducted by another pair of researchers who were blind to the PCL-R scores of the subjects.

RESULTS

The voice recordings were analyzed using the VOXCOM system (Alpert, Merewether, Homel, Martz, & Lomask, 1986). The hardware rectified, demodulated, and digitized the recorded signal which had been filtered through passband filters set to pass the subjects' fundamental frequency. The software detects voice signals and locates peaks, the acoustic equivalent of syllables, and measures the amplitude for each peak. Utterances are defined as a string of successive peaks above a threshold. VOXCOM includes a graphics facility which provides a plot of the amplitude waveform of the rectified, demodulated speech signal, essentially the syllable waveform, against time. The measures derived from the analysis are transformed to z-scores. (Technical information about the VOXCOM system is available from Murray Alpert, NYU). Amplitude is measured as the height of peaks above threshold relative to the recorded calibration tone.

Statistical analyses were performed in two stages. The first analysis (Analysis 1) was performed on three spontaneous speech tasks: the semi structured interview (neutral affect), the positive emotional recall (positive affect), and the negative emotional recall (negative affect). The second analysis (Analysis 2) examined voice characteristics while the subjects read sentences with embedded high-imagery words of negative or positive emotional valence. Reading, although less spontaneous, permits control of the speech content.

Analysis 1: Spontaneous Speech

Using a 2×3 repeated-measures analysis of variance (ANOVA), we compared mean amplitude scores of psychopaths and nonpsychopaths for neutral, negatively, and positively valenced affective material which was spontaneously produced. Across all conditions, the mean amplitude for nonpsychopaths was 8.47 dB, while the mean amplitude for the psychopath group was 5.69 dB. This translated into a large between-subjects effect [$F(1, 18) = 8.82, p = .008$], with psychopaths speaking more quietly than nonpsychopaths. Figure 1 presents these results as a bar chart.

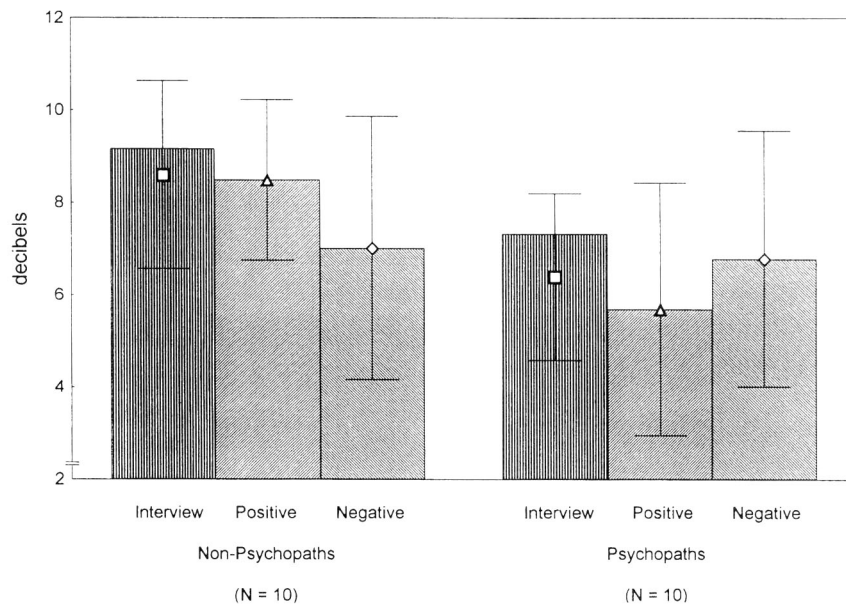


Fig. 1. Voice amplitude above calibration level during interview and positive and negative monologues.

Analysis 2

The second stage of statistical analysis (Analysis 2) was performed on results for the 16 sentences, each containing one emotional word of either positive or negative affective valence. Each sentence was broken into constituent parts using emotional valence as the criterion. Thus each sentence contained a target word (positive or negatively valenced), and neutral material. This material was examined in terms of amplitude.

Using a 2×3 repeated-measures ANOVA, we compared mean amplitude scores for psychopaths versus nonpsychopaths, for the neutral part of the sentences, the positive embedded words, and the negative embedded words. There were no significant between-subject effects, but the interaction (Psychopaths \times Affective Valence) was significant [$F(2, 36) = 5.89, p = .006$]. Following up with simple main effects analysis revealed that, for nonpsychopaths only, voice level differed with emotional valence. Tukey's multiple comparisons resulted in a significant amplitude difference for words of negative affective valence. These results are shown in Fig. 2.

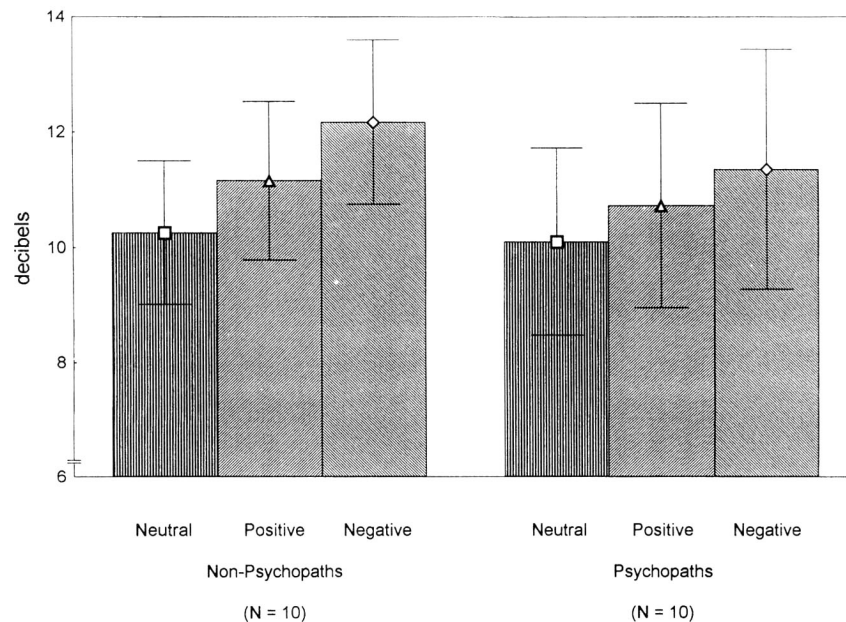


Fig. 2. Voice amplitude above calibration level during the reading of neutral words, and positive and negative embedded words.

DISCUSSION

The main within-subject difference between the tasks in this study is spontaneity of speech. The reading task permitted us to control word content to ensure that group differences were not an artifact of differences in word selection. Use of interview and monologue tasks in the spontaneous condition encourages confidence in the generalizability of the results.

When subjects were asked to discuss neutral, negative, and positive emotional topics, they were speaking spontaneously, and in this condition there were significant between-subject effects, with psychopaths speaking more quietly than non psychopaths. An integral feature of the psychopathic personality is the ability to con and manipulate, while appearing charming and sincere. Manner of speech may represent one more weapon in their arsenal of techniques since a quiet tone could be effective in drawing the listener in and convincing her or him of the speaker's sincerity. Rieber (1997) and Rieber and Vetter (1995) discussed this notion in terms of the manipulation of meaning through the communication of deceit. By speaking softly, the listener is implicitly encouraged to sit closer, thus being exposed more effectively to the manipulative techniques referred to by Rime et al. (1978), making it easier for psychopaths to exploit personal space and make prolonged eye contact.

The spontaneous speech tasks used in this study gave us the opportunity to examine the inmates in both conversational and monologue conditions. Any gain in validity, however, is balanced by a lack of experimental control of the content. Although we tried to influence the material by using neutral topics for the conversation, and requested negative and positive emotional recall for the monologues, we had little control over what the subjects said. In contrast, the nonspontaneous task consisted of a controlled sample of negatively and positively valenced words, read aloud by each subject in a series of 16 sentences. In this task, we were able to vary the emotional valence of the stimulus, and analyze amplitude of subjects' voices. Here, the significant interaction suggests that psychopaths seemed oblivious to the affective valence of the material, and treated affective words as devoid of emotion.

A range of factors, including the ambient noise level and the subjects' sidetone level have been shown to affect how loudly a person speaks (Alpert, 1966). Similarly, emotional activation, such as when lying, has been shown to systematically affect voice levels although the magnitude, and even the direction, of the effects of lying show individual—perhaps personality—differences (Friedhoff, Alpert, & Kurtzberg, 1962). In light of the current findings, it would be of interest to ascertain the pattern of effects of external (ambient noise levels) and internal (emotional activation) manipulations of

psychopaths and controls and whether psychophysiological mediators affect voice level in controls but not psychopaths. There are myriad behaviors and tasks pointing to alternative language processing patterns in psychopathy, but differences in approaches in the literature make identification of the Central Nervous System bases for these differences elusive.

The voice analyses in the present study are consistent with a growing body of evidence that psychopaths fail to process emotional material in a normal way—evidence which may begin to clarify their failure to develop empathy and conscience. Since we are now able to detect psychopathy in subjects as young as 13 years (Forth, Hart, & Hare, 1990), it would be of interest to conduct similar studies with children and youths. The current study, in finding that psychopaths speak more quietly than nonpsychopaths, may provide the first empirical confirmation of clinical and anecdotal impressions of the smooth-talking conman.

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