Effects of Affective Tone on Spoken Word Recognition

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Abstract: The present study investigated the role of emotional tone of voice in the perception of spoken words. Listeners were presented with emotional words that had either a happy, sad, or neutral meaning. Words were spoken in a tone of voice (happy, sad, or neutral) that was either congruent, incongruent, or neutral with respect to affective meaning and naming latencies were collected. The results showed that emotional tone of voice facilitated linguistic processing of emotional words. These findings suggest that information about emotional tone is used quite early in the processing of linguistic content.

INTRODUCTION

Traditionally, the study of emotional tone of voice has been considered separately from the study of the formal linguistic aspects of spoken language. Research has either focused on how listeners detect emotion in an individual’s voice or on how listeners extract abstract linguistic properties from the speech signal. This empirical and theoretical separation rests on the assumption that independent mechanisms underlie the perception of these two aspects of spoken communication. Consequently, little is known about how these two sources of information interact during spoken language processing (1,2). The purpose of the present study was to address this gap by investigating the potential integration of emotional tone of voice into the linguistic processing and representation of spoken words.

EXPERIMENT

The present experiment was designed to determine if emotional tone of voice affects the time course of lexical access and word recognition. Words having a single affective meaning (happy, neutral, or sad) were presented to listeners in three different emotional tone of voice conditions (happy, neutral, or sad). Listeners were asked to shadow or repeat the words as quickly as possible and naming latencies were collected. It was hypothesized that if emotional tone of voice affects early linguistic processing, then affective tone should influence the time course of the lexical processing of emotional words. However, if the perception of emotional prosody and linguistic content are independent, then differences in affective tone should have little effect on the naming of spoken words.

Listeners. Ninety-eight students at Emory University participated in one of the three tone of voice conditions. All listeners were native English speakers with no history of speech or hearing disorder.

Stimulus materials. A list of emotional words with happy (n=28), sad (n=21), and neutral (n=29) meanings was constructed based on listeners’ ratings of emotional meaning. Examples are shown in Table 1. One male and one female amateur actor recorded each word in the three different affective tones (happy, sad, and neutral). Acoustic measurements and listeners’ tone of voice judgments confirmed that the different tones were both acoustically and perceptually distinct. During the experiment, half of the listeners heard the male and half heard the female speaker.

<table>
<thead>
<tr>
<th>Affective Meaning</th>
<th>Words</th>
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<tbody>
<tr>
<td>Happy</td>
<td>cheer, kiss, laugh</td>
</tr>
<tr>
<td>Neutral</td>
<td>chair, label, rice</td>
</tr>
<tr>
<td>Sad</td>
<td>regret, sorrow, upset</td>
</tr>
</tbody>
</table>

Design and Procedure. Words were presented in random order and listeners were asked to repeat each item as quickly as possible. Naming latencies were recorded from the beginning of the word to the time the listener initiated a naming response. To correct for differences in word length, word duration (in ms) was subtracted from the reaction...
time for each word. The study involved a 3 (tone of voice) by 3 (affective meaning) mixed design with meaning varying within subjects. Response times were averaged across the two speakers.

RESULTS

Figure 1 shows naming latencies (corrected for word duration) as a function of affective meaning and tone of voice. Naming responses were evaluated with a 3 (word meaning) x 3 (tone of voice) ANOVA. Naming times were faster overall for both happy and sad words across tone of voice, \( F(2,186) = 65.30, p<.01 \). However, the pattern of naming latencies across happy, neutral, and sad words changed as a function of tone of voice condition, \( F(4,186) = 16.94, p<.01 \). Post-hoc means comparisons confirmed that naming latencies were faster for happy than for neutral or sad words in the happy tone of voice (\( p<.01 \)). Similarly, naming times were faster for sad than for neutral or happy words in the sad tone of voice (\( p<.01 \)). Latencies for happy and sad words did not differ in the neutral tone of voice (\( p>.1 \)).

![FIGURE 1. Mean naming times for emotional words as a function of meaning and tone of voice.](image)

DISCUSSION

The results of this experiment suggest that emotional tone of voice significantly influences the time course of lexical processing. Specifically, listeners were fastest to name items when tone of voice was congruent with the semantic content of the word. Happy words were responded to fastest when produced in a happy tone of voice and likewise, sad words were responded to fastest when produced in a sad tone of voice. This finding suggests that the perception of spoken language is certainly not independent of the perception of emotional prosody (1). Rather, the integration of emotional tone of voice with linguistic content both occurs very early in the processing of spoken language and does so in a semantically congruent fashion (2). This congruence effect suggests that emotional prosody provides a specific semantic or communicative context which facilitates and shapes early linguistic processing.

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