

Auditory recognition of idioms by native and nonnative speakers of English: It takes one to know one

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ABSTRACT

The abilities of second language speakers to discriminate the prosodic contrasts between idiomatic and literal meanings of ambiguous sentences were investigated using utterances previously shown to be reliably identified by acoustic cues. Four listener groups of varying proficiency, native speakers of American English, native speakers of non-American English, fluent nonnative speakers of English, and advanced students of English as a second language (ESL), judged whether single and paired, tape-recorded, literal and idiomatic utterances were spoken with intended idiomatic or literal meanings. Both native speaker groups performed significantly better than fluent nonnatives, while ESL students performed at chance. These results lend support to the hypothesis that abilities to discriminate subtle prosodic contrasts are learned later than other components of speech and language.

Idioms, proverbs, speech formulas, and other familiar conventional expressions, although neglected in earlier modern linguistic theory (exceptions are Chafe, 1968; Fraser, 1970; Heringer, 1976; Katz, 1973; Makkai, 1972; Weinreich, 1969), form a large portion of everyday communication (Coulmas, 1981, 1994; Cowie, 1998; Peters, 1983; Van Lancker, 1973, 1975, 1987; Wray & Perkins, 2000). Familiar conventional expressions include a broad range of more or less “memorized” constructions (Bolinger, 1976; Lyons, 1968) such as slang, quotations, sayings, irreversible binomials (“salt and pepper”; Cooper & Ross, 1975; Malkiel, 1959), expletives, song lyrics, indirect speech acts, and professional jargon (Van Lancker, 1999). Fillmore (1979) stated that nativelike fluency in a language is dependent largely on knowledge and proper use of formulaic expressions; and Pawley and Syder (1980) argued that “sounding like a native speaker” involves appropriate use of these conventionalized phrasal units. Schegloff (1998) noted that competent and routine use of formulaic language allows for displays of paralinguistic information. For second language (L2) learners, learn-

ing formulaic language is a complex, even arduous, process requiring special treatment (Bygate, 1988; Howarth, 1998; Weinert, 1995; Wray, 1999a, 1999b).

Mastery of an L2 presents a unique difficulty in part because idiomatic expressions are made up of stereotyped forms associated with conventionalized meanings, allowing only narrow ranges of variability in usage. Words in the idiom are often not used with their usual meanings (e.g., “She has him eating out of her hand”). The expression occurs on a narrow range of possible intonational contours (Bolinger, 1986, p. 280, 1989). Novel sentences appear in a range of grammatical structures and lexical choices; in contrast, appropriate use of idioms requires relative exactness in expression and usage. Lindfield, Wingfield, and Goodglass (1999) suggested that prosodic shapes are stored with phonological material in the mental lexicon. A production error heard in the spontaneous speech of speakers of English as a second language (ESL), “I wouldn’t want to be in his *shoes* like that,” illustrates the integral role of prosodic features. For the native English speaker, not only would the expression end with *shoes*, but it would have the sentence accent on *his*. From a study revealing the inability of Japanese speakers to discriminate the /r/ versus /l/ distinction in English at the cortical level (Buchwald, Van Lancker, Erwin, Guthrie, & Schwafel, 1994), it can be assumed that errors in production are correlated with insufficient perceptual ability. It is this inference that leads to this study of perception of acoustic cues distinguishing literal from idiomatic expressions.

The inability to produce accentless speech in a L2 learned after childhood has been widely noted (e.g., Lenneberg, 1967; Major, 1987; Neufeld, 1980; Ryan & Sebastian, 1980; Scovel, 1969, 1988). Much of the observed accent resides in prosodic aspects. Even after phonology, syntax, and semantics are apparently mastered, L2 speakers often retain prominent prosodic features—those of pitch, loudness, timing, and voice quality—intrinsic to their native language (Van Els & de Bot, 1987), and details of prosody inherent in the L2 are particularly difficult to teach the L2 speaker (e.g., Gilbert, 1984, 1993; Young–Scholten, 1993). The ability to hear prosodic differences has been less studied. Prosody may be the least “perfectly” learned aspect of adult L2 acquisition. The present study examined the abilities of highly practiced and experienced L2 speakers on a task requiring judgments of subtle prosodic contrasts.

Studies have suggested that idiomatic (or formulaic) language and literal language are learned and used according to fundamentally different psycholinguistic processes (Peters, 1977; Swinney & Cutler, 1979; Vihman, 1982; Wray & Perkins, 2000). The claim that they are represented in different cerebral hemispheres is elaborated elsewhere (Van Lancker, 1975, 1990; Van Lancker & Kempler, 1987). Lounsbury (1963) noted that use of two constructions, one ad hoc and the other “familiar and employed as a whole unit,” constitutes different behavioral events and that “their psychological statuses in the structure of actual speaking behavior may be quite different” (p. 561). During speech perception and registration, units of different sizes (phonological units, syllables, morphemes, words, and phrases) are computed, or “chunked” (Cole & Scott, 1974; Marslen–Wilson & Welsh, 1978; Simon, 1974). Idioms are recognized and remembered as integral units, in contrast to novel phrases, and prosodic cues are utilized generally in the structural analysis in speech perception (Brown, 1997;

Buttet, 1988; Buttet, Wingfield, & Sandoval, 1980; Cutler, Dahan, & Donselaar, 1997; Geers, 1978; Price, Ostendorf, Shattuck–Hufnagel, & Fong, 1991; Wingfield, 1975). Prosodic material is intimately tied to constituent size and type in speech perception. An inability to process prosodic cues to determine unit size and kind during listening may impede successful speech perception. Although semantic and pragmatic contextual features provide strong cues for first language (Gibbs, 1980; Van Lancker & Canter, 1981) and L2 speakers (Berkovits, 1980), intonation and rhythm nevertheless have an important role in listening comprehension (Gilbert, 1983, 1984). In natural language use, especially when semantic and pragmatic cues are absent or ambiguous, and generally for efficient comprehension, inadequate knowledge of functional prosodic cues may place a burden on the L2 listener.

Some studies (e.g., Flege & Eefting, 1987) have focused on phonetic detail of accented speech, whereas others have investigated the prosodic features, that is, timing, stress, rhythm, and intonation (Bond & Fokes, 1985; Gilbert, 1980; Grover, Jamieson, & Dobrovolsky, 1987; Levitt, 1991; Schneiderman, Bourdages, & Champagne, 1988; Taylor, 1988; Van Els & de Bot, 1987; Varonis & Gass, 1982; Yilmaz, 1981). Gilbert's (1984, 1993) teaching materials include prosodic elements. For the most part, however, the focus for phonetic and prosodic matters has been on literal utterances. Studies of formulas in L2 acquisition have utilized written corpora (Granger, 1998; Howarth, 1998), except for Bolander (1989), who noted the importance of "prosodic frames" for learning formulas (p. 82). Although some controversy persists (Fox Tree & Meiyer, 2000), prosody is known to provide robust cues to structural and semantic interpretations of sentences (Cutler et al., 1997; Misono, Mazuka, Kondo, & Kiritani, 1997; Schafer, Speer, Warren, & White, 2000). The current study investigates the abilities of L2 speakers of English to perceive and recognize prosodic cues distinguishing literal from idiomatic utterances.

A previous study using native speakers of English (Van Lancker & Canter, 1981) found that prosodic cues were sufficient to distinguish idiomatic from literal utterances. Using the auditory signal only, native listeners could reliably identify the intended meaning of tape-recorded utterances that were "ditropically" ambiguous: the expression could be interpreted either literally (as a proposition) or figuratively (as an idiom). Only highly familiar idioms were used (Cronk & Schweigert, 1992; see Appendix A). Quantitative analysis of acoustic cues revealed that pausing, fundamental frequency (F_0) height and contour, and duration significantly differentiated literal from idiomatic exemplars and that voice quality was used intermittently to contrast the two meanings (Van Lancker, Canter, & Terbeek, 1981). Literal expressions contained significantly more pauses between key lexical items, a greater incidence of rapid rises and falls of F_0 on individual words or phrases within the expression, longer durations overall and of words, and higher mean F_0 than their idiomatic counterparts. Voice quality signaling irony occurred more often with idiomatic productions, whereas emphatic intonation occurred more often with literal productions.

The present study probed the abilities of ESL speakers of two levels of proficiency to distinguish idiomatic from literal utterances using prosodic cues. Subjects were highly proficient speakers of ESL, who had achieved near nativelike

competence in their use of grammar and expression of ideas compared to less proficient speakers of ESL. Although the primary purpose was to compare listening performance by speakers at these three levels of proficiency, other factors were also examined, such as linguistic training, age of first learning experience with the L2, and language learning method, which might influence perceptual skills in speakers of ESL.

METHODS

Stimuli

The stimuli were the same as in the previous study (see Van Lancker & Canter, 1981, for a complete description). Fifteen ditropically ambiguous sentences (see Appendix A) were each recorded twice by two native speakers of American English, once with an intended idiomatic meaning and once with an intended literal meaning. The stimuli were arranged into two tasks for listeners: randomly ordered single sentences (60 items) in order to evaluate listeners' abilities to recognize prosodic cues on idiomatic- or literal-intended utterances without benefit of contrastive information, and contrastive pairs (30 pairs), such that one pair member carried the idiomatic-intended meaning and the other was the literal version (in randomized order). The interstimulus interval for single sentences and pairs was 6 s; the interstimulus interval between pair members was 2 s. Three training items were presented before each task, and feedback was given until the subjects understood the task. The single sentences were always presented first. Within the pairs, the order of the two versions was randomly alternated. In the previous study, native listeners' performance was 85.5% correct for single sentences and 89.6% correct for pairs (see Figure 1). These results were available for comparison to the present study, which utilized a subject population with different demographic factors.

Subjects

A total of 123 subjects, all adults ranging in age from 22 to 45 years and with normal hearing and vision, without significant medical or psychiatric history, and with college or postgraduate education, were tested. Thirty-nine were native speakers of American English, 14 were native speakers of non-American English, 46 were nonnative speakers of English who used English as their primary language in daily communication in work and at home ("fluent nonnatives"), and 24 were students of ESL in the advanced class at a local city college (ESL students). Although English was the language of instruction in the ESL classroom, none of these students used English at home. Formal graduate training in linguistics, including instruction in phonetics, phonology, syntax, and semantics, was present in three of the groups. Eighteen of the native speakers had such training, as did 4 of the native speakers of non-American English and 16 of the fluent nonnatives; no persons with linguistic training were found among the ESL students. The non-American native English speakers included a variety of dialects from the United Kingdom, New Zealand, South Africa, and Australia.

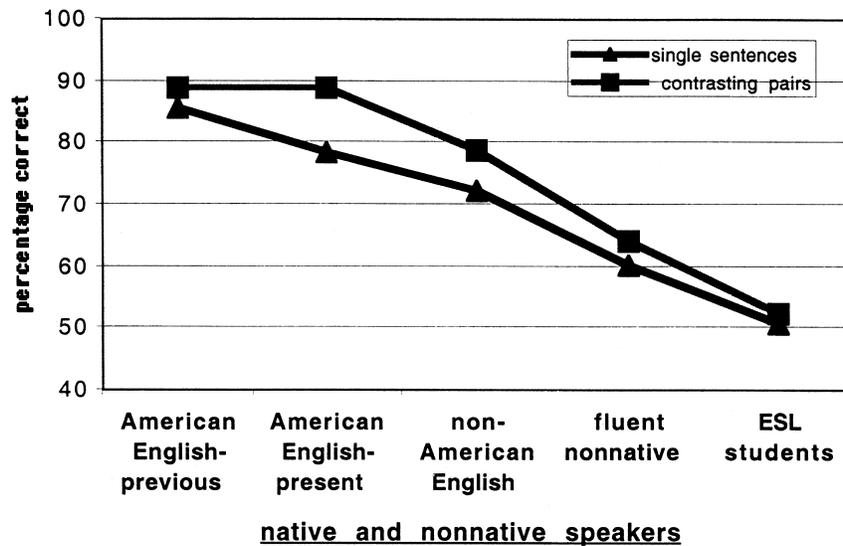


Figure 1. Identification of idiomatic versus literal meanings of singles and sentence pairs.

These speakers were analyzed separately because of possible differences in prosodic and idiomatic systems. The fluent nonnatives and ESL students came from a broad spectrum of language backgrounds (Hebrew, Arabic, Spanish, Ilocano, Chinese, Swedish, Ga, Finnish, Chaga, German, Danish, Persian, Farsee, Korean, French, Tagalog, Latvian, Bulgarian, Kacchi, Russian, Polish, Vietnamese, and Hungarian).

Procedure

All subjects were first given a training session in which it was explained that some sentences can be understood only literally, such as “He is reading the newspaper”; some sentences are used only idiomatically (under normal circumstances), such as “Button your lip”; and some sentences can have either a literal or an idiomatic meaning, such as “She missed the boat.” Subjects were given an opportunity to discuss the ideas and were collectively and individually queried as to their comprehension of the distinction. Twenty examples of common American English idioms similar to those used in the test were presented in a handout and discussed. All subjects appeared to understand the principle with no difficulty and showed familiarity with the examples. No test items were included in the training materials.

Subjects were instructed to listen to the tape-recorded sentences over loudspeakers in a quiet environment. All subjects heard the two tasks in the same order: first, randomized single sentences; second, contrastive pairs. Subjects were told that each utterance was spoken with an intended literal meaning or an intended idiomatic meaning. Their task was to determine which meaning was

intended simply by listening carefully to the utterance. For each test item, subjects were told to write down an L (for literal) or an I (for idiomatic) on a numbered answer sheet. For the contrastive pairs, subjects were advised to listen to both stimuli before making their judgments, and then to write L or I for each member of the pair. Three practice items from the set of test sentences were given for each task. The score was the percentage of correct identifications of the intended meaning.

Following the listening session, nonnative speakers (fluent and ESL) all received a questionnaire asking about language background, kinds of instruction in English, age of onset of instruction, years in class, quantity of current use of English, and training in other languages besides English. As described above, subjects were divided into those with and those without graduate linguistic training.

RESULTS

The results are shown in Figure 1. Native speakers of English achieved the highest scores on both tasks, and speakers of non-American English outperformed both nonnative groups. The ESL students performed at or near chance on both tasks. A mixed design analysis of variance (ANOVA) comparing all four groups showed a significant main effect of group, $F(3, 119) = 32.57, p < .0001$, and a significant main effect of task, $F(1, 119) = 12.84, p < .0001$, but no interaction. The speakers of non-American English differed only marginally from the native speakers of American English, $F(1, 51) = 4.83, p < .04$, but they performed significantly better than the fluent nonnative speakers, $F(1, 58) = 7.19, p < .01$.

The effect of graduate linguistic training was analyzed for native and fluent nonnative speakers. Among the native speakers, linguists performed better than nonlinguists (83.7 vs. 74.2%) on single sentences ($t = 3.61, df = 37, p < .001$, two-tailed) and pairs (linguists = 94.3%; nonlinguists = 84.5%; $t = 3.48, df = 37, p < .001$). In contrast, although mean performance scores were higher for some subjects in the linguistically trained group, no significant effect of linguistic training was observed in native speakers of non-American English (83.8 vs. 67.6% for single sentences, 92.1 vs. 73.7% for pairs) or for fluent nonnative speakers (63.4 vs. 58.6% for single sentences, 64.8 vs. 63.1% for pairs).

Mean performance of native speakers on single sentences in the present study was lower (78.6% correct) than in the previous study (85.5% correct; Van Lancker & Canter, 1981). On reanalyzing subject information, subjects in the present study were found to differ from the previous study group in ethnic background. Of the 30 subjects in the present group who could be contacted for information (77% of the total number), 10 had parents who were not native speakers of English. A comparison was made using the mean correct performance score (78%) from the present study as the cutoff. Of the 10 subjects in the current study with one or two nonnative patients, 7 scored between 63 and 78% correct. Of the other 20, whose parents were native speakers of English, only 4 scored at 78% or below. This difference was significant by a chi-square analysis ($\chi^2 = 7.177, p < .01$; see Table 1).

Table 1. *Chi-square table showing subjects scoring 63–78% correct compared to those scoring above 78% (mean performance of the lower scoring group)*

| | ≥78% | <78% |
|------------------|------|------|
| Nonnative parent | 7 | 3 |
| Native parents | 4 | 16 |

Note: The results show a significant tendency for listeners with at least one nonnative parent to score in a lower range than listeners with both native parents ($\chi^2 = 7.177, p < .01$).

In order to evaluate whether individual sentences or a subset of sentences were responsible for the differences between the nonlinguist native and fluent nonnative groups, two types of item analysis were carried out. For each sentence, the number of errors made on paired presentations by the members of each group was tabulated. First, the relationship between errors made by the native group on each sentence and those of the nonnative group was examined using linear regression analysis. There was a significant relationship between the scores of the two groups ($r = 0.572; t = 5.313; p < 0.001$). Further, this analysis identified only a single sentence (“The coast was clear”) with a significant normalized residual score (2.409), indicating that it alone was classified as an outlier ($p < .05$). This indicates that individual test items did not significantly (i.e., anomalously) affect the test results. A second item analysis was conducted using a mixed model ANOVA with items as the random factor and scores averaged over subjects, again comparing nonlinguist native and nonnative groups on performance on single sentences. This analysis yielded main effects of group, $F(1, 29) = 122.9, p < .0001$, and of utterance type, $F(1, 29) = 11.32, p < .001$, but no significant interaction, suggesting generality of the results to other expressions with literal and nonliteral meanings.

Language background data was evaluated for effects on performance in the fluent nonnative group. Number of years of English study, number or type of other languages spoken, and age of acquisition (which included either classroom instruction or informal learning in the United States, whichever came earlier) did not significantly correlate with performance. In addition, another question involved the critical period hypothesis (Lenneberg, 1967), the apparent inability of most people to achieve natively like accents in an L2 after puberty (Flege, 1988; Scovel, 1988; Tahta, Wood, & Loewenthal, 1981). Assuming that production and perception skills are linked, two subgroups were formed from the fluent nonnative group: late bilinguals, who had emigrated to the United States as young adults and had not been exposed to or studied English until after age 13, and early bilinguals, those first exposed to English in school at age 5 or 6. No significant difference between these groups on performance was observed on single items or pairs. Only one parameter was significantly associated with per-

formance in this group: the number of years lived in the United States ($r = 0.35$; $p < .025$, for both single and paired presentations).

The ESL students performed at chance and also had the lowest standard deviation on single sentences of the four groups tested. Therefore, it is not surprising that there were no significant correlations between their performance and any of the language learning parameters considered in our questionnaire. The high standard deviation in scores on paired presentation suggests that some subjects were able to discriminate the utterances but were uncertain about the classification.

DISCUSSION

Fluent nonnative speakers, although highly competent speakers of English, performed significantly worse than native speakers in recognizing idiomatic versus literal meanings of ambiguous sentences in a listening task. ESL students were unable to identify literal and idiomatic meanings when listening to single sentences or paired sentences. Three explanations could apply. Errors could be due primarily to deficient linguistic processing in general, specific problems with the idiomatic expressions, or problems with the prosodic cues differentiating the two meanings. Questioning of ESL subjects following the listening session suggested that comprehension of literal meanings was not a problem. Familiarity with idioms varied with the item and with the individual student. Thus, poor performance was likely due to lack of familiarity with the idioms, inability to recognize key prosodic cues, or both. From this perspective, failure to perform well on single sentences is easily explained. It is more interesting, however, that the ESL students performed equally poorly on sentence pairs, which directly contrasted the relevant acoustic properties.

The observation that paired presentation did not improve performance in the ESL subjects addresses two questions that can be raised about this experiment. One question involves the possible adoption of a superficial listening strategy, in that listeners (natives as well as nonnatives) could have used discernable, ad hoc acoustic cues that are not generalizable to natural use of literal and nonliteral language. To utilize such a strategy in this way, subjects would have to “guess” which sentence was which. In fact, six ESL students performed significantly above chance (4–20 pairs wrong out of 60), whereas eight performed significantly below chance (40–52 pairs wrong out of 60; $p < .05$). All or some of these students may have been utilizing prosodic cues for discriminating the sentences, and the worse than chance group applying the cues backward. However, performance by ESL subjects overall did not significantly improve on contrastive pairs. Further, if ad hoc acoustic cues were sufficient to lead to correct identification of literal and idiomatic contrasts, then it would be expected that linguistic training would significantly improve performance by fluent nonnative speakers on paired sentences because linguistic training includes training in recognition of phonetic and acoustic detail. However, no such improvement was noted. These results suggest that prosodic cues in idiomatic expressions form part of the native speaker’s competence. Experimental evidence for this view comes from a previous study by Lieberman (1963), who also found acoustic

differences between literal and idiomatic phrases; speakers produced a (target) word differently in nonliteral contexts such as “A stitch in time saves *nine*” compared to literal exemplars such as “The number I will say is *nine*,” with predictably increased intelligibility, as shown in listeners’ judgments.

The second question pertains to whether the prosodic cues differentiating idiomatic and literal speech are universal. It has been suggested that certain aspects of prosody, both linguistic and affective, assume similar shapes and functions across the world’s languages (Bolinger, 1964, 1986, 1989). However, it is also known that crosslinguistic differences in prosodic patterns are great and the differing patterns can be reliably distinguished (Ohala & Gilbert, 1981). The observation in this study that performance by ESL students did not improve on contrastive pairs suggests that the prosodic cues specifically differentiating idiomatic from literal meanings of ambiguous phrases are language specific.

Results from the questionnaire revealed an effect only of one factor on performance on this task: time in the United States. The mostly negative results arising from the demographic analyses here are attributable at least in part to the heterogeneity of the samples. The main subject groupings, however, bore out the predictions that even highly proficient nonnative speakers would miss subtle prosodic cues.

There was a significant tendency in the present study for native American English speakers with at least one nonnative parent to perform worse on the single sentence task than listeners with native parents. From these observations, one might consider the possibility of deficient prosodic competence in American English speakers brought up in households where the caretakers were not native speakers. This testable proposal is a corollary of the general hypothesis that essential aspects of native prosodic competence are established very early in the language learner. Indeed, it has long been reported that some prosodic cues in speech are acquired very early by infants in both productive (Crystal, 1970, 1976; Penman, Cross, Milgrom–Friedman, & Meares, 1983) and receptive modes (DeCasper & Fifer, 1980; Fernald, 1985; Fernald & Kuhl, 1987; Houston & Jusczyk, 2000). It is likely that in first language acquisition, nonliteral expressions and their inherent prosodic features are acquired together, and at a rate that differs from that of the acquisition of syntax and lexicon (Kempler, Van Lancker, Marchman & Bates, 1999; Locke, 1997; Peters, 1977; Wong Fillmore, 1979).

This study has shown that differences between two kinds of language, idiomatic and literal, are signaled by quantifiable prosodic cues in English and that native listeners of the same dialect can reliably discriminate between them whereas nonnative speakers have significantly more difficulty. From a grammatical standpoint, prosodic cues specifying pausing, length, pitch height, and pitch contour are capable of indicating whether an utterance is to be processed either as a whole, bypassing ordinary lexical meanings and grammatical structure (as in an idiom), or as a sequence of lexical items with syntactic relations (a literal sentence). In developing techniques for teaching formulaic and idiomatic language in L2 acquisition, a consideration of prosodic factors may be helpful. Further study leading to effective pedagogical presentation of these prosodic contrasts may aid the L2 learner.

APPENDIX A

SENTENCES USED IN THE STUDY

Each was produced by two speakers with a literal and idiomatic meaning intended.

1. You find it's rotten to the core.
2. She was to keep a stiff upper lip.
3. We saw that we had left no stone unturned.
4. It broke the ice.
5. It came straight from the horse's mouth.
6. He was at the end of his rope.
7. It took the wind out of his sails.
8. David spilled the beans.
9. I hit the sack.
10. That's a real snake in the grass.
11. The coast is clear.
12. He didn't know he was skating on thin ice.
13. I also had an axe to grind.
14. It was the usual procedure, about once a week, to wash their dirty linen in public.
15. She had him eating out of her hand.

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