

Laughter Among Deaf Signers

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The placement of laughter in the speech of hearing individuals is not random but “punctuates” speech, occurring during pauses and at phrase boundaries where punctuation would be placed in a transcript of a conversation. For speakers, language is dominant in the competition for the vocal tract since laughter seldom interrupts spoken phrases. For users of American Sign Language, however, laughter and language do not compete in the same way for a single output channel. This study investigated whether laughter occurs simultaneously with signing, or punctuates signing, as it does speech, in 11 signed conversations (with two to five participants) that had at least one instance of audible, vocal laughter. Laughter occurred 2.7 times more often during pauses and at phrase boundaries than simultaneously with a signed utterance. Thus, the production of laughter involves higher order cognitive or linguistic processes rather than the low-level regulation of motor processes competing for a single vocal channel. In an examination of other variables, the social dynamics of deaf and hearing people were similar, with “speakers” (those signing) laughing more than their audiences and females laughing more than males.

Laughter is one of our species’ most prominent and characteristic vocalizations (Provine, 2000). It is more

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like the calls and cries of other animals than human speech. Laughter is an instinctive, early appearing, contagious vocalization produced in social settings ranging from conversation to tickle (Gervais & Wilson, 2005; Provine, 1996, 2000). Laughter is under weak voluntary control, and, as with the similar instinctive act of crying, few people are able to convincingly laugh on command (Provine, 2000). Laughter is produced by chopping an outward breath into a series of short vocal vocalizations, both voiced and unvoiced, that repeat about every one fifth of a second (Bachorowski, Smoski, & Owren, 2001; Provine, 2000; Provine & Yong, 1991; Vettin & Todt, 2004, 2005). Although the acoustic features of laughter are stereotyped (Provine, 2000; Provine & Yong, 1991), laughter shows context-related variations that influence its social potency (Bachorowski & Owren, 2001; Kipper & Todt, 2001, 2003). As with smiling, there may be two types of laughter that vary in the degree of voluntary control and sensitivity to social contingencies (Gervais & Wilson, 2005).

The social function of laughter is striking—people laugh 30 times more frequently in social than in solitary situations (Provine & Fischer, 1989). Both the speaker and audience laugh during conversation, with the relative proportion varying with gender and familiarity (Grammer, 1990; Provine, 1993; Smoski & Bachorowski, 2003). Males and females, for example, are more likely to laugh in response to a male than a female speaker (Provine, 1993). Contrary to folk wisdom, most conversational laughter follows banal

comments like “I’ve got to go now,” not jokes or other formal attempts at humor (Provine, 1993). Laughter is not exclusive to humans, being shared with great apes and, perhaps, other mammals (Provine, 1996, 2000). Contrasts between chimpanzee and human laughter provide insights into the origin of both human laughter and speech and the role that bipedality and associated breath control played in their evolution (Gervais & Wilson, 2005; Provine, 1996, 2000, 2004).

Laughter is a powerful, if unlikely, tool for studying a variety of linguistic, social, psychological, and neurological issues in both deaf and hearing individuals (Provine, 1993, 2000). The fact that deaf people laugh, for example, indicates that the experience of hearing laughter is not necessary for the basic vocalization to develop in either hearing or deaf individuals (Eibl-Eibesfeldt, 1973). This article takes another approach, focusing not on the act of laughter itself, but on when deaf and hearing people laugh during conversation. Of particular interest is the *punctuation effect*, the tendency to laugh at places where punctuation would be placed in a transcript of a conversation (Provine, 1993). Laughter of hearing people punctuates speech, occurring at places in the speech stream associated with pauses, phrase boundaries, and the beginning and end of statements and questions. Thus, a speaker may say, “You are going where?—ha-ha,” but rarely “You are going—ha-ha—where?” Because laughter seldom disrupts the phrase structure of conversational speech, speech is dominant over laughter and has priority access to the vocal apparatus (Provine, 1993, 2000). The punctuation effect extends to the audience, which has no comparable vocal constraint and could laugh at any time during the speech stream. Punctuation was not found in the more specialized case of maternal, infant-directed speech (Nwokah, Hsu, Davies, & Fogel, 1999) that included *laughspeak*, a hybrid of speech and laughter excluded from most previous research on adult-directed laughter (Provine, 2000).

Punctuation effects are not unique to laughter. Speaking, itself, involves redirecting the respiratory apparatus to vocalizing. Hearing people either speak or breathe during conversations, with breaths coming at linguistically significant punctuation points similar to those described for laughter (McFarland, 2001;

Winkworth, Davis, Adams, & Ellis, 1995). Remarkably, the breathing, speaking, and laughing of both speaker and audience are synchronized. Punctuation also extends to the placement of emoticons, symbols such as smiley faces that denote emotional state and appear in typed text messages posted on Web-based message sites (Provine, Spencer, & Mandell, 2007). The generality of reciprocal activation and coordination of competing modes of expression finds comparative, cross-species support in the punctuation of songs by wing displays of the brown-headed cowbird (Cooper & Goller, 2004). The cowbird coordinates a wing display and vocal respiratory movements such that silent periods of its song coincide with wing movements that may adversely influence respiration.

Previous research has shown that American Sign Language (ASL) conforms to the same linguistic and psycholinguistic principles as spoken languages (e.g., Emmorey, 1993, 2002; Thompson, Emmorey, & Gollan, 2005). This study takes the unusual tact of using laughter, a vocal act, to investigate linguistic structure, social dynamics, and emotional expression during the silent, visual-manual communication of ASL. The study of the placement of laughter in the stream of signing examined whether the punctuation effect extends to manual signing that is not competing with laughter for a channel of expression, as is the case with vocal speech and laughter (Provine, 1993, 2000). Laughter-punctuated signing would indicate that both sign and speech are governed by similar linguistic programming and social dynamics. The study also addressed whether gender or conversational role (i.e., audience vs. signer) influences the pattern of laughter among deaf signers, as it does for hearing speakers.

Method

Participants

The 38 participants (19 men and 19 women) were between 15 and 60 years of age ($M = 41$ years). Twenty-four participants were native signers (born into deaf signing families), and 14 acquired ASL later in childhood. Seventeen participants were born deaf, and 10 participants became deaf between 4 months and 5 years of age. The age of deafness onset for the remaining 11 participants was unknown. Thirty-three

Table 1 Gender composition of the ASL conversations analyzed for the occurrence of laughter

| Conversation | Gender | |
|--------------|--------|------|
| | Female | Male |
| A | 3 | 0 |
| B | 0 | 2 |
| C | 0 | 4 |
| D | 1 | 2 |
| E | 1 | 2 |
| F | 2 | 2 |
| G | 2 | 1 |
| H | 2 | 1 |
| I | 2 | 1 |
| J | 3 | 2 |
| K | 3 | 2 |
| Total | 19 | 19 |

participants self-identified themselves as deaf and five as hard-of-hearing.

Data Collection

The data consist of 125 digitized occurrences of vocal laughter excerpted from 11 videotaped, casual, signed conversations between two to five participants. Of the 11 conversations, two had all male participants, one had all female participants, and eight had both male and female participants (see Table 1). The videotapes, each approximately 30 min in duration, were recorded as a part of a sociolinguistic study of ASL signers (Lucas, Bayley, & Valli, 2001).¹ The analysis included only cases in which laughter was clearly vocalized; visual indications of laughter (e.g., smiling and shaking shoulder movements) that were not accompanied by an audible vocalization were excluded from the analysis.

Data Analysis

Using Provine's (1993) convention, laughter episodes (incidents of laughter) were categorized as either "speaker" laughter produced by the signer or as "audience" laughter, produced by the viewer of the signed message. "Speaker" refers to the person who is signing to avoid confusion with the term "signer," which typically refers to someone who is capable of either producing or receiving a signed message. Laughter episodes were identified and categorized by

a hearing ASL signer who was naive to the hypotheses. The position of vocal laughter in the stream of signing was categorized as either *simultaneous* (laughter overlapped substantially with signing) or *punctuated* (laughter occurred at a break in signing or at a phrase boundary, with little or no overlap with signing). Phrase boundaries were defined as a pause during which the hands were inactive (e.g., prior to signing), held motionless, or lowered after signing.

Audience laughter was similarly categorized. If the audience laughed while the speaker was signing, it was coded as a simultaneous audience laugh. If the laugh occurred after the signer had finished signing or paused during signing, it was coded as a punctuated audience laugh.

Results

The laughter of deaf participants was obvious and easily identified but sounded more varied than the typical laughter of hearing people. Details about the sound and structure of deaf laughter await future acoustic analysis. The focus of this study was not laughter itself, but when laughter occurred during signing.

During a 30-min signed conversation, participants who laughed at least once ($n = 28$) laughed more when they were speakers (i.e., they had the floor and were signing) than when they were part of the audience, $t(27) = 3.14$, $p < .01$. Participants produced a mean of 3.4 laughter episodes as a speaker but only 1.3 laughter episodes as an audience. Of the 125 laughter episodes, 92 (74%) were produced by the speaker versus only 33 (26%) by the audience.

The laughter of speakers punctuated the phrases of ASL. Twenty-four participants produced at least one laughter episode as a speaker during a 30-min conversation. Speaker laughter occurred significantly more often at phrase boundaries than in midphrase (simultaneously), $t(23) = 3.23$, $p < .01$. A mean of 2.79 laughter episodes per speaker (73%) occurred at phrase boundaries versus a mean of 1.04 laughter episodes (27%) that occurred simultaneously with signing (see Table 2).

Examples of speaker laughter at phrase boundaries are given below in (1). By convention, words in capital

Table 2 Mean number of laugh episodes for each participant as speaker (the person signing) and as an audience member

| | Punctuated | Simultaneous |
|-----------------------|-------------|--------------|
| Speaker ($n = 24$) | 2.79 (0.54) | 1.04 (0.38) |
| Audience ($n = 18$) | 0.72 (0.18) | 1.11 (0.24) |

Note. Standard error is given in parentheses.

letters represent English glosses (the nearest translation equivalent) for ASL signs. Multiword glosses connected by hyphens are used when more than one English word is required to translate a single sign. Letters separated by hyphens indicate a finger-spelled word. An English translation of the ASL is given in quotes below each example.

(1) Examples of speaker laughter:

- a. [laughs] YOU CHALLENGE-ME YOU
“[laughs] you’re challenging me!”
- b. SEARCH [laughs] RIGHT
“You were hunting around [laughs] that’s right.”
- c. PRONOUN WELL EUROPE [laughs]
“Well, she’s European [laughs].”

Audience laughter, in contrast, did not punctuate signing. Among the 18 participants who produced at least one episode of audience laughter, there was no significant difference between the number of laughs that occurred during a pause/phrase boundary or while the speaker was signing, $t(17) = 1.38$, ns. A mean of 1.11 audience laughter episodes (61%) occurred during the speaker’s signing versus a mean of 0.72 laughter episodes (39%) during a pause in speaker signing.

Examples of simultaneous audience laughter are given below in (2).

(2) The location of audience laughter is indicated by brackets:

- a. GO-TO CLASS [CARRY-BY-HAND SHOE B-O-X CARRY-BY-HAND]
“..went to class carrying a shoe box.”
- b. YOU [SOMETIMES WALK T-O H-I-L-L-S]
“Sometimes you walk to the hills.”

To examine effects of gender in laughing, we conducted an analysis of variance with the following experimental design: 2 (participant gender: male and female) \times 3 (gender of the conversational partners: all female, all male, and both male and female). The total number of participant laugh episodes per 30-min conversation was the dependent measure. For groups with both male and female participants, we coded the gender of conversational partners with respect to each participant within that conversation. For example, in a group with two males and one female (e.g., conversations D and E in Table 1), the female participant was coded as conversing with only males, whereas the two male participants were coded as conversing with both a male and a female (a “mixed-gender” group).

Overall, females laughed more ($M = 4.0$ laughter episodes per conversation) than males ($M = 2.3$ laughter episodes per conversation), $F(1, 32) = 7.67$, $p < .01$. There was also a main effect of the gender of the audience (male, female, or a mixed-gender group) on the number of laughter episodes, $F(2, 32) = 4.31$, $p < .05$. Participants (either as speaker or as audience) laughed less when their conversational partners were only female ($M = 1.8$ laughter episodes), compared to when they conversed with males only or with a mixed-gender group ($M = 4.8$ and 3.0 laughter episodes, respectively). Finally, there was an interaction between the gender of the participant and the gender of their conversational partners, $F(2, 32) = 4.58$, $p < .01$ (Table 3). Females laughed more when they conversed with males only ($M = 12.5$ laughter episodes) than when they

Table 3 Mean number of laughter episodes per conversation

| Participant gender | Gender of the conversational partners | | | M |
|--------------------|---------------------------------------|------------------------|------------------------|------------------------|
| | Female only | Male only | Male + Female | |
| Female | 2.7 (1.2) ($n = 3$) | 12.5 (5.5) ($n = 2$) | 3.1 (1.0) ($n = 14$) | 4.0 (1.1) ($n = 19$) |
| Male | 1.0 (1.7) ($n = 3$) | 2.2 (1.2) ($n = 6$) | 2.8 (1.2) ($n = 10$) | 2.3 (0.7) ($n = 19$) |

Note. Standard error is given in parentheses.

conversed only with females or with a mixed-gender group ($M = 2.7$ and 3.1 laughter episodes, respectively). In contrast, males laughed less in the company of females ($M = 1.0$ laughter episode) than when conversing with males only or with a mixed-gender group ($M = 2.2$ and 3.7 laughter episodes, respectively).

Finally, participants from deaf families ($n = 24$) did not laugh significantly more or less than participants from hearing families ($n = 14$), $t(36) < 1$ ($M = 3.4$ and 3.3 laughter episodes for each group, respectively). In addition, native signers and nonnative signers did not differ with respect to the laughter punctuation effect, $F > 1$ for the interaction between parental status (deaf, hearing) and laughter placement while signing (phrase boundary, simultaneous).

Discussion

Vocal laughter marked the ASL conversations of deaf signers. Consistent with the report of laughter in deaf-blind children by Eibl-Eibesfeldt (1973), we found that laughter developed in individuals who were either deaf from birth or became deaf in early childhood and, therefore, were either unable or diminished in their ability to learn the vocalization from others. However, the primary question of this study was not whether deaf people laugh (the answer to which is clearly affirmative) or the quality of their laughter (largely an open question), but the linguistic and social context of their laughter once it occurs.

Vocal laughter by the speaker (the person signing) punctuated signing, a finding consistent with the placement of laughter in the speech of hearing speakers (Provine, 1993). The punctuation effect extends to manual signing, where, in contrast to the situation with laughter and speech, there is no competition for the organ of vocal expression. Thus, the central coordinating process for the placement of laughter must involve a higher order process involving linguistic expression, not a lower level process governing access to the vocal tract by competing motor acts. The fact that the pattern of laughter did not differ between nonnative signers with hearing parents and native signers with deaf parents indicates that the punctuation effect is robust and unaffected by variations in signing skill. Because speakers' laughter was

not simply superimposed over their signing, it appears that the more recently evolved mechanism of linguistic expression with its greater voluntary control can regulate the more ancient, involuntary mechanism of emotional expression (Provine, 1993, 2000). The dominance of language over laughter is consistent with a role of punctuated laughter in signaling the emotional tone of the preceding or following statements, or turn-taking in conversation. However, such punctuation functions do not imply or require the conscious intent of the speaker to place laughter in signing. Laughter is under weak conscious control, as demonstrated by our inability to produce convincing laughter on command (Provine, 2000, pp. 49–51).

Punctuation is not exclusive to the placement of laughter in spoken and signed language, but extends to the placement of breaths in vocal speech. Like laughter, breaths mark turn-taking and other linguistic boundaries for both speaker and audience (McFarland, 2001; Winkworth et al., 1995). (The relationship between respiration and signing is unknown.) Emoticons (i.e., smiley faces) also punctuate English text messages on Web-based interest groups (Provine, Spencer, & Mandell 2006).

Unlike deaf speakers' punctuation of their signing with vocal laughter, the laughter of deaf audiences often occurred simultaneously with the signing that they were viewing. This contrasts with the punctuation of vocal speech with laughter by both hearing speakers and their hearing audiences (Provine, 1993). Deaf audiences may be more likely to laugh during signing because vocal laughter does not interfere with the visual perception of signing, unlike the probable degradation of the perception of speech by the laughter of a hearing audience. In addition, the laughter of hearing audiences is stimulated more by auditory than visual cues, as evidenced by the "contagious" laugh response that is the basis of television laugh tracks (Provine, 1992, 2000). Hearing laughter may lead to stronger audience punctuation effects because listeners are stimulated to laugh when they hear a speaker laugh at a phrase boundary or during a break in speech. Viewed laughter may be less contagious, which could reduce or eliminate the audience punctuation effect for deaf audiences.

Deaf speakers (signers), as with hearing speakers (Provine, 1993), usually laughed more than their

audience, refuting the commonly held idea that laughter is a response of an audience to a speaker stimulus such as humor. Laughter of both deaf and hearing individuals is best understood as a social act produced by all parties (speaker and audience) of a social encounter. The production of laughter is influenced by gender context. In this study, females laughed more than males, another parallel with hearing individuals (Provine, 1993; but see Smoski & Bachorowski, 2003). Both male and female speakers laughed more in the company of a male-only or a mixed-gender than female-only group, with female speakers laughing more in the company of males and males laughing least in the company of females. These similarities in gender-specific and speaker-audience laughter patterns of deaf and hearing people suggest that nonauditory, probably visual, cues influence the laughter of both groups.

An informal examination of the signing that preceded laughter episodes revealed that many prelaugh comments were not jokes, but rather banal, nonwitty comments. For example, the following mundane statements preceded laughter episodes (English translations of the ASL): “we were chatting back and forth,” “you never did,” and “that’s interesting.” Similarly, Provine (1993) reported that most prelaugh, vocal comments of hearing English speakers were not formal attempts at humor, but commonplace and unremarkable statements.

Previous studies have demonstrated that signed languages are true languages of impressive power whose acquisition by deaf children provides an effective means of communicating and developing intellectual skills (for a review, see Emmorey, 2002). Here we took the nontraditional approach of comparing signed and vocal communication to gain insights into the production, control, and linguistic context of laughter in both hearing and deaf people. This study revealed that the presumably silent environment of deaf signers is actually filled with laughter that is produced in linguistic, social, and gender contexts often similar to those described for hearing people.

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