



# Laughing in interaction: How phonetic details can coordinate action sequences

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## Abstract

The natural home of laughter is in interaction. In this paper, we explore cases of laughter as a joint production, and examine the phonetic resources available to the interactants to manage the temporal coordination of their laughter. We show that participants in spoken interaction can make use of the rhythmic and 'intonational' affordances of laughter to manage aspects of its unfolding in time, and its relation to subsequent talk. We thus approach laughter dialogically and consider how participants in interaction treat one another's laughter moment-by-moment.

**Index Terms:** laughing, conversation analysis, phonetic details

## 1. Introduction

Describing the phonetic form of laughter is challenging; explaining it is a further challenge. The aim of this paper is to provide examples of how to combine the descriptive with the explanatory part of conversational laughter by looking at laughter in its local context in spoken interaction. We argue for a dialogic treatment of laughter, i.e. how aspects of the design of laughter are treated by both interlocutors in dialogue. We build on previous work on the phonetics of laughter and studies showing what interactional work laughter does.

In this paper we explore how participants orient to audible features of laughter. In most of our data, participants do not have visual access to each other. Scenarios include talking on the phone or being recorded in a task-based conversation in the lab. We show how conversational partners, called co-participants here, display an orientation to the forms of another's ongoing laughter, and to the actions of concurrent talk or laughter through their own behaviour. Specifically, this paper combines phonetics with conversation analysis (CA) [1] to offer an account of how the composite phonetic elements of laughter can be organised by speakers in interaction to manage participation in aligning and affiliative ways and coordinate potential closure of action sequences. In other words, we show how bouts of solo and jointly produced laughter may have an internal structure that can contribute to the projection (anticipation) of their closure.

### 1.1. Phonetic forms of laughter

The potential complexity and the combinatory possibilities of phonetic material make analysing the phonetic characteristics of laughter very difficult [2]. There seem to be elements in the phonetic design of laughter which can index how a particular bout of laughter is meant to be treated. In the following, we provide some important characteristics of laughter.

Laughter involves a complex temporal interplay on the respiratory and the phonatory level, but not very much on the articulatory level. Most types of laughter are normally recognised as such through its repetition of similar particles ('calls' [3] or 'pulses' [4]) occurring in succession in a single outbreath, forming a unit called a 'bout'. Laughter pulses normally have a longer breath element, and a shorter vocalic element, although the composition can be quite diverse [5]. A laughter pulse may start with breath or a glottal fricative, stop, or trill articulation of a voiced or voiceless kind, often accompanied with a vowel. Vowels can be voiced or voiceless, creaky or breathy. Alternatively, laughter can be produced as a sequence of pulses made of an audible nasal escape of high intensity with alveolar or labiodental articulations.

The pulses in each 'bout' of laughter share similar characteristics, leading to their perception as belonging to the same laughter unit. On the one hand, the pulses are disjunctive from prior talk as they are produced with higher  $f_0$ ; on the other hand, they are grouped together by their phonetic similarity: they bear rhythmic regularities [4,6] separated by near-equal intervals of time, as well as being arranged together under a coherent perceptual  $f_0$  'contour'. This contributes to the projectability of the laughter bout end, as we show in this paper. The contours may be made up of incremental increases or decreases in  $f_0$  for voiced segments, and in intensity, as seen in the example in Fig. 1. Laughter bouts are often closed with a highly audible inhalation (in-breath by ingressive airflow, 'h'), which bears an ambiguous status as to its membership to the unit or its being used as a boundary marker [3,5,7]. We explore laughter bouts as units whose phonetic components and potential boundaries give bouts some structure that participants can use interactionally. We focus on overlapping laughter first and compare it with laughter that is not joined in with.

Some prior studies have explored some of the phonetic features of joint laughter. [8,9] studied temporally overlapping and non-overlapping (solo) laughter in corpora in English and German. They found overlapping laughter to be more frequent and produced with higher  $f_0$  and intensity, longer duration and more voicing, and that these features facilitate affiliation in interaction, while solo laughter was mostly found to be produced with voiceless pulses in contexts that suggested no affiliation. In a similar vein, [10] studied laughter entrainment and convergence, identifying turn boundaries as places where co-participants align the design features of their laughter productions. Given that our main interest lies in the projectability of laughter ends for interactional purposes, the study by [11] on the phonetic features of vowels preceding laughter bouts is relevant, showing how phonetic detail can have an anticipatory role in talk, indexing next-actions.

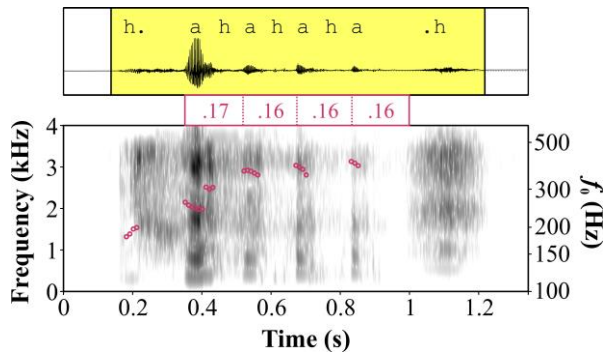


Figure 1: Laughter bout of four pulses (yellow) with an open vowel and a final inhalation noise (.h) and an initial exhalation noise (h.). Isochronous time intervals marked between the onsets of voiced vowels.  $f_0$  contour speckled over spectrogram on a logarithmic scale. Source: CallHome\_en\_3445:308 [19], female speaker.

## 1.2. Projectability

By ‘projectability’, we refer to features of a current turn-at-talk which project forwards in time to its ending. Projection is essential to turn-taking, since it provides a slot in time for a next speaker to come in without delay [12,13]. In the case of speech, things like syntactic organisation, voice quality, intonation and tempo contribute to projection [14,15,16]. In this paper, we argue that laughter also seems to have a projectable end-point.

In Example 2, A produces post-completion laughter, which B joins in with. A then B both take an inbreath (‘.h’), A produces two very quiet laughter-like pulses at the end of the section displayed in Figure 2. The next turn, by B, is on a ‘serious’ footing. How do A and B coordinate this simultaneous completion?

### Example 2: CallHome (English)

A: dad said there can be no oreos  
in the invitation package [laugh .h]  
B: [laugh .h]  
yeah actually I bought something like ...

The projectability of laughter is important because the end of laughter can mark the shift to a next thing in the sequence [17,18]. In some cases that ‘next thing’ is more talk that is laughable, such as the next part of the story; in other cases, it is a shift to a ‘serious’ footing. These shifts have interactional import. If one person continues laughing while the other shifts to ‘serious’, i.e. non-laughable, there is misalignment that might need to be resolved. So, the positioning and ending of laughter bouts carries interactional sensitivities.

## 1.3. Actions associated with laughter in interaction

In CA, a central question is to understand how social actions are accomplished, and how participants’ understandings of these actions are displayed. The positioning of laughter in talk and the actions of that laughter are intertwined. Below we review some of the most relevant actions and sequential positions where laughter has a role in our collection of cases.

Laughter episodes can be produced by a current listener during ongoing talk (e.g. storytelling), while the trajectory of the current speaker continues. The positioning and treatment of such tokens is very reminiscent of continuers (backchannels) [20], as displaying an appreciation of an ongoing course of action while providing for it to continue, thus treating it as incomplete and not competing for the turn, and aligning with the listener role.

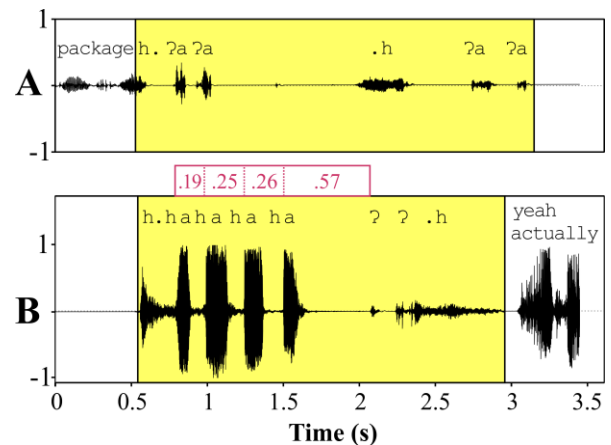


Figure 2: Section of overlapping laughter (yellow, 2.7 sec) from Example 2. Speaker A (top) with an inhalation noise (.h), speaker B (bottom) with inhalation noise before continuing speaking, taken from the CallHome corpus [19]. ? = glottal stop

Laughter can also be deployed at points where affiliation and the display of a particular stance is made relevant [21]. Laughter can mitigate the sense of ‘trouble’ in troubles tellings; it can be concurrent with particular words so as to identify the source of trouble or inadequacy [22,23]. In such cases, laughter is not reciprocated by the troubles-talk recipient.

Laughter bouts produced towards or after the end of a turn at talk, perhaps concurrent with speech, can be treated as an invitation to a co-participant to laugh along, so that there is a bout of joint laughter, and a display of mutual affiliation between the co-participants [24].

## 2. Examples

We present two case studies of laughter in our data where the phonetic form of the laughter and the dialogical evidence from its subsequent treatment by the co-participant seem to be related. The cases, like others in our collection, also show a connection between phonetic features of laughter and matters of alignment and affiliation during and at the potential end of an ongoing course of action. In the first case, the two participants produce joint laughter that finishes more or less simultaneously. This happens at a point where laughter is an adequate form of affiliating response to the action in progress. The onset of post-laughter talk is likewise simultaneous. In the second case, there is solo laughter part way through the telling at a point where aligning is a suitable response. The laughter is not taken up by the other, but both speakers orient to its completion.

### 2.1. Shared simultaneous laughter

In Example 3 (Fig. 3), the speakers produce joint laughter. At the end of this bout, they both start speaking more or less simultaneously. How is this laughter accomplished and managed in time as a joint production? How does it come to be that the laughter bout is over for both of them at apparently the same time?

The example shown in Fig. 3 is taken from the Lindenstrasse corpus [25] where friends have to put snippets of a given episode of a German TV soap opera in the right chronological order. Only a part of the snippets was identical for both speakers, A and B. The characters are known to A and B, and A gives a narration of a scene that B has not seen where he uses a word-for-word quote which both speakers find quite funny.

After the shared laughter both start a turn with a discourse-initial marker ('also', 'ja').

A's turn-so-far is syntactically incomplete, suspended with a glottal stop in '-tief?' B's first four laughter pulses treat A's talk-so-far as projectably 'laughable'. They are isochronous, voiceless, nasal and quiet, and thus seem designed with sensitivity to being produced in overlap with A's ongoing talk (cf. the example in Fig. 2).

The joint laughter bout starts at c. 2.0 sec, with A and B both producing voiced laughter pulses. In broad terms, both produce two phrases of laughter in this period, but these two phrases are not identical: for A, there are three laughter pulses in each phrase, while for B, there are five. Nonetheless, the phrase boundaries closely coincide in time.

A's laughter shares several features with speech: phrasing, pitch relations between units, and rhythm. The last pulse in each phrase of his bout is longer than the previous two: [ || ha ha ha: | ha ha ha: || ] (cf. Fig. 3). The pulses are nearly isochronous and together with the repetition they project a next temporal slot. The second phrase is in a lower register and the last two notes have a down-step rather than the up-step of the first phrase. The temporal slot for a potential third phrase is left silent.

B's laughter consists of two groups of five pulses. The first group of pulses finishes at the same time as the first three pulses of A's 2 x 3 laughter pulses. It contains rising pitch to the third pulse, then falling pitch accompanied by a drop in amplitude. The second phrase is lower in pitch register than the first, but with the same overall contour, indexing a possible ending.

The ending of this laughter bout is complex. B does first a loud inhalation at the end of the second laughter phrase at 4.0 sec. There is then a 0.4 sec silence and a period where they both do an inhalation, more or less simultaneously, but of different kinds: for A, it is voiced and pulmonic, with quite a high pitch and strong glottal initiation. The latter suggests that the silence before the inhalation is contiguous with his previous voiced laughter. For B, the inhalation is voiced at the beginning and there is friction, which impressionistically sounds as alveolar or labiodental with spread lips. This second inhalation displays an orientation to the absence of a coordinated laughter-closing inhalation on his first attempt.

A and B both treat the inhalation as laughter-closing – they both start a next turn more or less simultaneously. The different types of inhalation produced suggest that the precise details of articulation do not matter so much as the fact that the bout is concluded with an audible ingressive airstream. They are also relatively long (600-800 ms), and with a downward shift in  $f_0$  (if voiced) or in the spectral properties (if unvoiced). Audible inhalation is an iconic way to project readiness to talk [26]. This doesn't deny that the presence or form of the inhalation is connected to for instance physiology [4] but there is no reason why such an element cannot be multifunctional. What is crucial here is the timing of the actions.

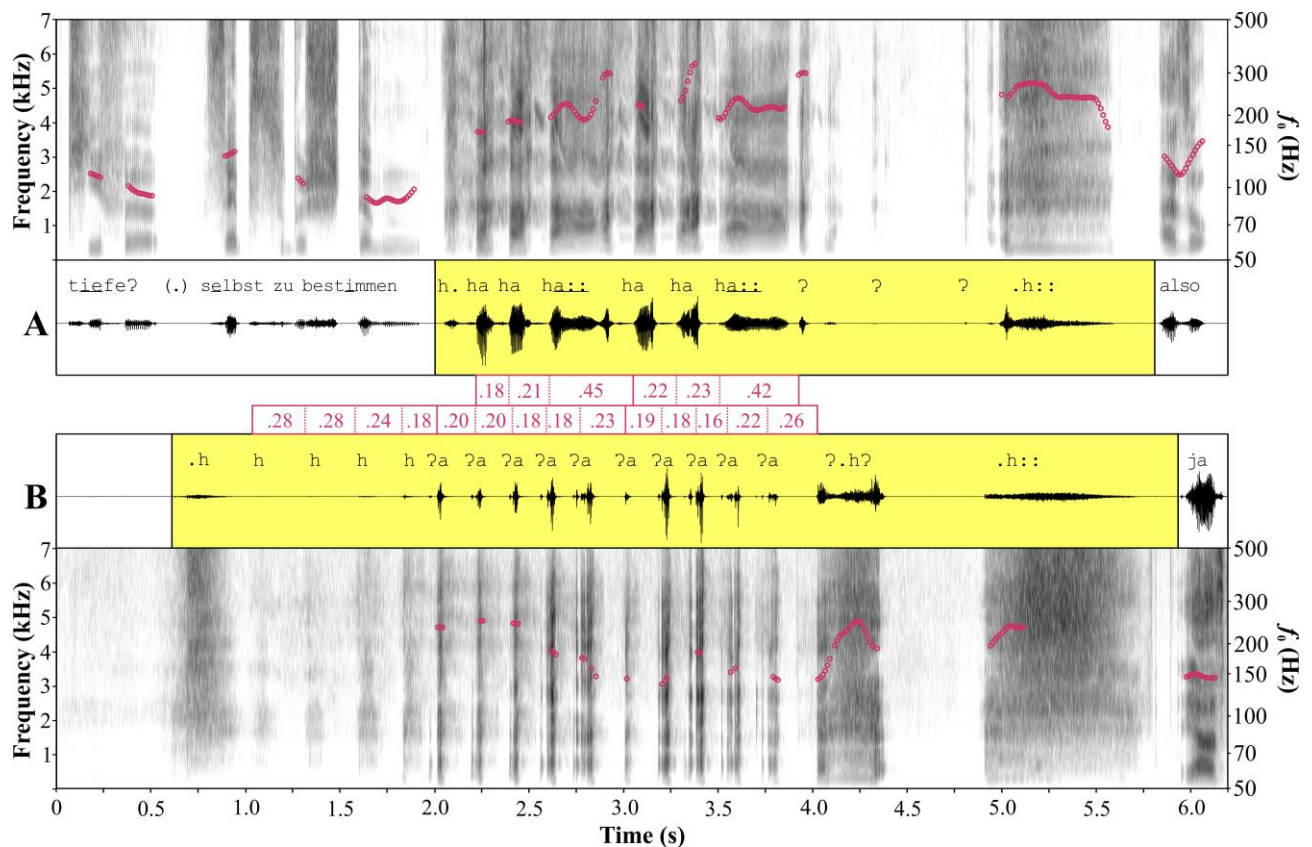


Figure 3: Overlapping laughter of two male German speakers (A and B), indicated by yellow shading. The boxed numbers indicate the duration (in sec) of intervals between vocalic onsets of laughter pulses.  $f_0$  is plotted on a logarithmic scale. Source: Lindenstraße corpus [25], dialogue 6, time stamp: 262-321s; ? = glottal stop, (.) = short pause, : = lengthening, \_ = stressed, h = inhalation.

## 2.2. Solo laughter

The example for solo laughter is taken from the Austrian German GRASS corpus [27] containing dialogues of friends and relatives with no specific topic or task. The selected example (Fig. 4) shows laughter that is treated as a continuer [20]. The female speaker (A) produces a turn that is syntactically, prosodically and pragmatically complete. Immediately on its completion, she produces an inhalation, which prefaces an extension to her turn initiated with ‘und’ (‘and’). The male speaker (B) initiates his laughter straight after this inhalation, and it is in overlap with her turn extension. His laughter is responsive to A’s description of the retreat in a monastery taken by some people which was treated as laughable by B. However, A does not reciprocate B’s laughter. B’s laughter is low in volume, voiceless and nasal, and it concludes with a series of glottal pulses before he takes an inhalation, in overlap with the next phrase in A’s telling.

### Example 4: GRASS (German)

A: wo sie eine Aszeit genommen haben  
*where they’ve been on a retreat*  
 in irgendso einem Kloster  
*in some monastery or other*  
 A: oder so irgendwas,  
*or something like that*  
 .h [und wie super des wa:r].h  
*.h and how great that was .h*  
 B: [nh. nh. nh. nh.]  
 B: ? ? ? ? [ (0.7) ] [.nh  
 A: [und dann] [denke ich mir schon  
*and then I assume*  
 vielleicht hat es wirklich was das  
*perhaps it is indeed decent this*  
 B: mhm

B’s laughter offers a non-verbal comment on A’s turn and does so in such a way that laughter is not constructed as a joint activity, nor is A’s talk treated as laughable by both parties. B’s voiceless and quiet laughter seems particularly fitted to its role in this sequential environment. It is audible but lacking the

structure of the laughter bout of Fig. 3, with a different rhythmical pattern and no voicing and pitch, and low intensity. So, its form seems to suit its function as a comment on someone else’s ongoing telling and in overlap with another’s talk. The ‘overlap’ part seems important too: if A has projected further talk, and B laughs in overlap with that, then the quietness of B’s laughter is interactionally significant.

## 3. Conclusions

With a focus on the intersubjective nature of laughter we are able to see its relevance for both (all) participants and its interactional consequences. The examples we have analysed show that the phonetic form of laughter is intimately connected with its function in interaction. Laughter has certain affordances, such as the presence/absence of voicing and pitch, pulsing and rhythm, and variations in loudness and audibility, which make particular forms of laughter suitable for particular interactional tasks and positions in the sequence. Participants in interaction use these affordances to mark laughter as something to be joined in with, or not; and they are able to entrain to, mirror and recycle elements of another’s laughter. In line with [28] we argue that laughter is not only strongly tied to linguistic structure, but also uses very similar phonetic techniques such as rhythmic and intonational patterns in interactionally precisely time-aligned phrases.

Joining in with laughter, or not, and coming in with a next appropriate thing at the right time is a sensitive interactional decision: not laughing when laughter was due, shifting to ‘serious’ too early or too late, or laughing when laughter was not due all have social consequences. Our analysis has therefore emphasised how one person’s laughter is treated by another, moment by moment. In this respect, our treatment of laughter in conversation has underscored its dialogic nature.

**Acknowledgements:** This research was partially supported by GAČR (Czech Science Foundation), Project 21-14758S and by Deutsche Forschungsgemeinschaft, Project-ID TR 468/3-1.

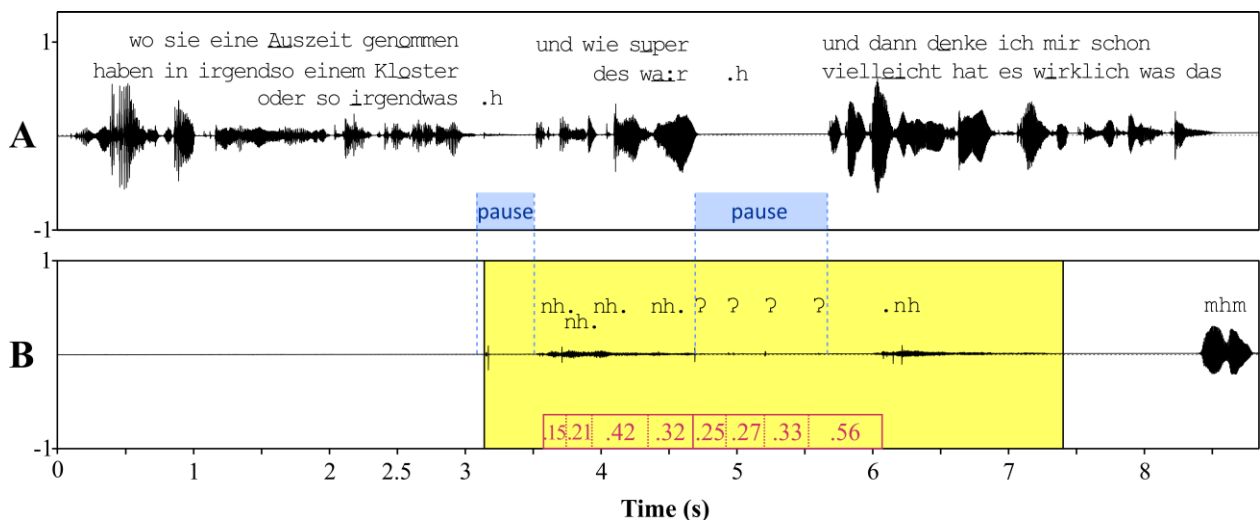


Figure 4: Part of Example 4 as waveforms with the voiceless laughter of speaker B (male) in yellow and the speech pauses including inhalation noises of speaker A in light blue. The red boxed numbers indicate the duration (in sec) of intervals between the onsets of laughter pulses. Data from GRASS corpus [27], nh. = unvoiced nasal exhalation, .nh = unvoiced nasal inhalation (also see Fig. 3).



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