

TIMING OF LAUGHTER IN CONVERSATION: BETTER LATE THAN NEVER?

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ABSTRACT

Studies in Conversation Analysis show that timing is a cue for preference organisation of pragmatic meanings. Responses that occur outside of an expected temporal window tend to be associated with dispreferred options and/or negatively charged meanings. The present perception study applied the predictions of conversation analysis to laughed (as opposed to spoken) responses, hypothesising that timing of genuine laughter obeys similar time constraints. We investigated perceptions of voiced and unvoiced laughs occurring at three time points and in three discourse contexts. The results show that delayed laughs were rated as significantly less genuine and more sarcastic than laughs that occurred within the expected time window or earlier. The timing effect was moderated by laughter type and discourse context. The results confirm that timing of a response contributes to conversational meanings, though the effect is not as general as previously suggested.

Keywords: laugh, laughter types, conversation, timing, humour, sarcasm

1. INTRODUCTION

Laughter permeates communicative interaction and is ubiquitous in our daily lives, e.g., [1], [2], [3], [4]. Being a form of non-verbal vocal behaviour, laughter occurs not only in humorous contexts but is generally known to promote positive and cooperative relationships between interlocutors during a conversation [5]. In fact, the prevalent function of laughter in a conversation seems to be purely interactional since most laughs tend to occur in the absence of humour [1], [2]. The full range of meanings that laughter can help to express during conversations is still rather poorly captured. In particular, the role of different laughter types and their timing in conversation have not been fully addressed in previous research.

Communicative exchanges take place rapidly, with interlocutors' turns concatenating with each other smoothly [6], [7]. Temporal gaps between turns observed in natural conversations average around 200 ms, with a vast majority transitions happening within

a window of 100 to 500 ms [6]. Very few turns tend to overlap or occur outside of the specified time window derived from large speech corpora [6]. It has been suggested that spoken interactions obey certain temporal organisation principles, such as minimal overlap or delay of interlocutors' contributions to the ongoing discourse [7]. There are also proposals suggesting that conversational turn-taking follows a regular 'beat' or an internal 'clock' allowing participants to orchestrate their verbal contributions in time [8], [9].

Moreover, the time window of a conversational response may indicate the meaning of that response. Conversation analysis of large databases has established that preferred responses (such as acceptances of invitations, inter-speaker agreements and encouragements) tend to occur early and smoothly, on completion of a turn or in a slight overlap with it [10], [11]. In contrast, dispreferred responses (such as rejections of invitations or disagreements) often occur after a noticeable delay [10], [11]. Accordingly, the timing of a response can be meaningful by itself. A response delivered after 700 ms or more is very likely to break bad news to the speaker waiting for their interlocutor's response. Early responses overlapping in time with the previous turn also seem to deliver dispreferred information, though the effect is not as consistent as the effect of a delayed response [11].

Little research exists on the timing of laughter in turn-taking and its conversational meaning. The interactional concept of 'invitation-acceptance' has been applied to laughs produced in a small corpus of spoken dialogues in German [12]. Accordingly, turn transitions involving laughter could be classified as either invited or self-initiated. The prevalent pattern of the dialogues involves the speaker's invitation to a joint laugh which is then followed by their interlocutor while self-initiated laughter of the interlocutor was observed slightly less often. Speed dating dialogues seem to follow a similar pattern whereby the incoming interlocutor tends to join an ongoing laugh some 300 ms after its start [13]. These findings suggest that temporal dynamics are at play when laughs are produced in conversation. Given that laughter prevails at the end of turns and utterances [14], it constitutes an ecologically relevant turn-taking phenomenon to study.

The present paper reports a perception study that was created to examine the question whether or not laughter, like speech, is expected to occur within a certain time window after a completed turn in order to be interpreted as genuine. Based on the existing works of Conversation Analysis [10], [11], we hypothesised that laughter deviating from a baseline time window would be perceived as disaffiliative, i.e., expressing distance and/or disapproval towards the previous utterance [15]. The perception can be expected to map onto laughter evaluations as insincere (“fake”) and critical/negatively disposed towards the addressee’s previous utterance (“sarcastic”). The testing of this hypothesis also takes into consideration different laughter types and laughter-eliciting contexts.

2. METHODS

2.1. Speech materials

Six conversational topics of daily relevance were chosen. Test items followed a 4-turn structure that varied according to the type of context in the second turn (i.e., the turn immediately preceding laughter). Three contexts were included in the present study: humorous, sarcastic, and literal. Table 1 gives an example of a topic and the pragmatic manipulation. Humour appeared as jokes or wordplays. Sarcasm indicated a non-ironic, insulting or mocking contribution. Literal evaluation was a genuine response without intended humour and was used as a control condition. This resulted in a total of 18 scripted conversations.

The materials were recorded by two female speakers of Standard Southern British English, with distinct voices that could be easily perceived as interlocutors A and B. The speakers were friends in real life, making the recordings of the conversations and laughs more authentic. The speakers were recorded in the linguistics laboratory of the University of Kent.

2.2. Laughter types

Different approaches to the categorisation of laughter tend to agree on at least one phonetic feature distinguishing between laughter types, namely the presence of voicing [16], [17], [18]. Harmonically rich, vocalised laughs that may contain vowel-like portions are sometimes considered stereotypical [16]. However, voiceless laughter that consists of bouts of nasal or oral air turbulence is a more frequently observed laughter behaviour [16]. Moreover, research suggests that the presence or absence of vocal fold vibration during a laugh may result in different perceptual evaluations of its function and

authenticity: Voiceless laughter tends to receive less positive ratings and may be perceived as less genuine but rather fake or sarcastic [16], [17], [19], [20].

The present study used a voiceless and a voiced laugh produced by one of the study speakers (A, Table 1). The spontaneously produced laughs differed slightly in duration. The duration difference was normalised using Praat, by slightly shortening both laughs to 570 ms. The intensity of the two laughs was also normalised by setting the maximal amplitude of each sound to a pre-defined value.

Speaker	Discourse context		
	Humorous	Sarcastic	Literal
A	<i>I've been running 10 miles every day preparing for the marathon</i>		
B	<i>It'll be worth it ...in the long run.</i>	<i>Can you even run a mile?</i>	<i>Sounds like hard work</i>
A	LAUGH		
B	<i>Good luck anyway</i>		

Table 1: Example of a conversation topic manipulating the discourse context of laughter occurrence.

2.3. Timing manipulations

The timing of laughter occurrence was manipulated to create three versions: early, late and baseline. The baseline was set to 300 ms, following previous research on the timing of turn-transitions in natural conversation [6], [11], [21]. The timing of a late response followed the threshold of 700 ms that has been previously shown to increase the amount of dispreferred or disaffiliative evaluations in conversations [11]. The early timing was set to 300 ms of overlap time between the previous turn and the incoming laughter.

2.4. Procedures

The conversation recordings were paired with the two laughs under three timing conditions, resulting in a total of 108 experimental stimuli (18 conversations x 2 laughs x 3 timings). The stimuli were divided into two sets, containing either voiced or voiceless laughs. The participants listened and responded to one set of the stimuli only, rating a total of 54 conversations. The ratings were collected on a 7-point Likert scale, with the participants responding to the question ‘*What is your impression of speaker A’s laughter?*’. Only

the endpoints of the scale were labelled, 1 as ‘genuine and friendly’ and 7 as ‘fake and sarcastic’. Since meta-pragmatic intuitions on sarcasm are expected to vary [22], [23], the scale combining elements of "speaker sincerity" (genuine-fake) and "speaker disposition" (friendly-sarcastic) was deemed representative of the distinction between affiliative and disaffiliative functions of laughter that the present study is concerned with.

The responses were collected online, using the Qualtrics software. All stimuli were presented in a randomised order. Listener responses were not timed but experimental instructions encouraged the participants to respond spontaneously and not to overthink their ratings. A short practice was given prior to the experiment. At the end of the experiment, participants were presented with 14 different laughs by the same female speaker (including the two experiment laughs) and asked to rate these laughs on a scale from 1 (controlled, not spontaneous at all) to 7 (extremely spontaneous, not controlled at all). The additional ratings established the baseline evaluation of the two experiment laughs outside of the selected conversational contexts.

2.5. Listeners

Sixty-seven listeners aged between 18 and 73 (mean age: 40), without any known speech or hearing disorders volunteered to participate in the study. Responses from five listeners were excluded from the analyses as the listeners were non-native speakers of English. This left a total of 62 complete datasets for the remaining analyses.

The study was approved by the Research Ethics Advisory Board of the University of Kent in June 2019. All participants gave an informed consent prior to the recordings and the perception experiment taking place.

3. RESULTS

Given the ordinal scaling of the dependent variable, we fitted Poisson mixed models to these data (estimated using ML and BOBYQA optimizers), to predict the rating of a laugh by laughter type (voiced, voiceless). For conversations, the predictors of interest further included laughter timing (baseline, early, late) and discourse context (literal, humorous, sarcastic) and their interactions with each other and with laughter type. Only results of the best-fit models are reported below.

The best-fit model of ratings obtained for the conversation stimuli included two significant interactions, between laughter type and timing ($\chi^2 = 7.60$, $p < 0.05$; plotted in Figure 1) and between

timing and discourse context ($\chi^2 = 13.36$, $p < 0.01$, plotted in Figure 2).

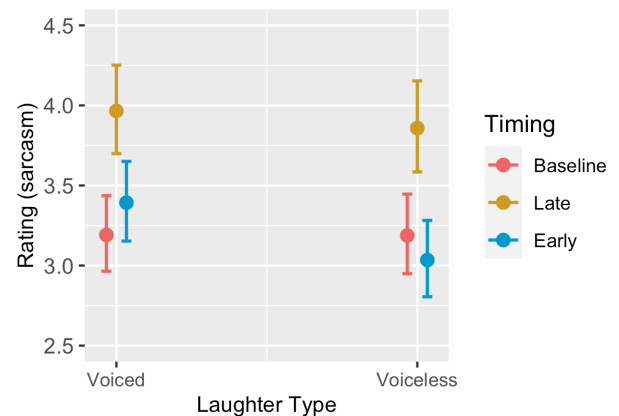


Figure 1: Estimated effects for the interaction between laughter type and timing.

Overall, there was no effect of laughter type on the perceptual ratings. Laughter type only mattered if its timing was early, i.e., overlapping with the preceding speaker turn. In these (but not any other) cases, the voiced laugh was perceived as significantly more sarcastic than the voiceless laugh ($z = 3.42$, $p < 0.001$). In addition, both types of laughter were rated as more sarcastic than the baseline (voiced: $z = 5.02$, $p < 0.001$, voiceless: $z = 3.80$, $p < 0.001$) if they were coming in as a late response. In contrast, both early-timed laughs were perceived similar to the baseline.

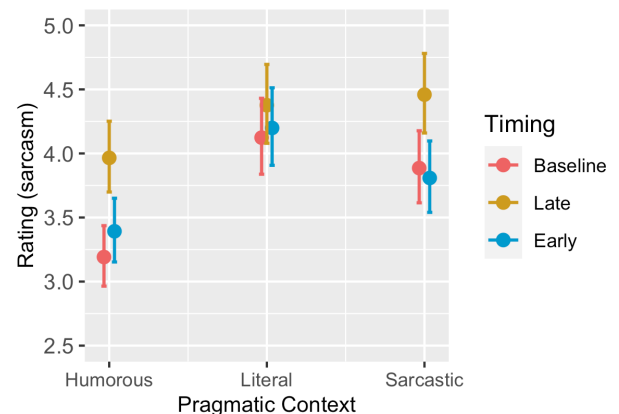


Figure 2: Estimated effects for the interaction between laughter timing and discourse context of conversation.

The interaction of laughter timing and discourse context indicates that timing does not matter for the perception of laughter in literal discourse contexts (see Figure 2). Instead, late timing leads to a sarcastic interpretation of the laugh in those contexts that carry the meaning of humour (late/baseline comparison: $z = 5.56$, $p < 0.001$; late/early comparison: $z = 5.42$, $p < 0.001$) or sarcasm (late/baseline comparison: $z = 3.66$, $p < 0.001$; late/early comparison: $z = 5.75$, $p <$

0.001). Early-timed laughs are perceived similar to baseline in both humorous and sarcastic contexts while late-timed laughs are perceived as more sarcastic in sarcastic than in humorous contexts ($z = 3.46, p = 0.0015$).

Finally, we examined the perception of isolated laughter as genuine and spontaneous, comparing only the two experimental stimuli. The two laughs indeed differed in their perceived spontaneity, with voiceless laughter being rated as slightly but significantly less genuine and spontaneous than voiced laughter ($z = 2.28, p < 0.05$).

4. DISCUSSION

The aim of the present study was to investigate the perception of laughter when its timing in the conversation is altered. Following existing findings of conversation analysis [10], [11], our main hypothesis proposed that laughter would be expected to follow the typical conversational transition of 300 ms, with deviations from this temporal window eliciting dispreferred or disaffiliative interpretations. We tested this idea by investigating perceptual responses to laughter in three types of mini-conversations (with literal, humorous, and sarcastic pragmatics) in combination with three conversational timings (baseline, early, late) and two laughter types (voiced, voiceless).

Overall, the results of the perception study with 62 listeners of different ages indicate that timing of laughter plays a major role in creating meaning in conversation, with delayed laughs being more likely interpreted as disaffiliative (sarcastic) [7], [24]. The latter finding supports the hypothesis based on previous research, though only partially [10], [11]. When it comes to a spoken response, any deviance from the baseline time window of 100-500 ms at the end of a turn tends to evoke a dispreferred interpretation. Yet when it comes to a laughed response, early timing does not seem to lead to a dispreferred interpretation. Perceptions of early laughs that show a substantial temporal overlap with the ongoing turn did not differ from the baseline; only delayed laughs did.

This finding may be related to general observation that laughter, unlike speech, often overlaps with turns of other interlocutors [13], [25]. Consequently, the conversational timing hypothesis ought to take the type of verbal responses into account. While late timings may tend to evoke dispreferred interpretations across a range of verbal responses, pragmatic interpretations of early timings depend rather heavily on the response being spoken or laughed.

Moreover, the perception of laughter timing in conversation varied with laughter type. Previous studies comparing voiced and voiceless laughter [16], [19] identified that voiced laughs tended to be perceived as more genuine and spontaneous than voiceless laughs. The present study confirmed this tendency for the two types of laughs used here, though only when these were judged in isolation. Embedded in a conversation and overlapping with the preceding speaker turn, it was specifically the voiced laugh that was perceived as more fake and sarcastic and not the voiceless laugh. The ratings from the two parts of the experiment are somewhat at odds with each other and highlight the need to study laughter under more naturalistic conditions (e.g., in pragmatically meaningful contexts).

As previously suggested, voiced laughter (due to the prevalence of high amplitudes, high mean F0 and strong F0 modulations during its production) has an arousing effect on listeners [16], [26]. Such high arousal of a voiced laugh may evoke the perception of sarcasm, given that an early-timed laugh of the present study does not follow the prevalent pattern of “invitation-acceptance” found in natural dialogues with laughed turn-transitions [25]. Even though voiced laughter is often considered a prototypical laugh, it is rather infrequent in comparison to unvoiced laughter [26]. Being unsolicited by context and otherwise infrequent, a voiced laugh may attract perceptual salience [27] that then, in combination with high arousal, is attributed to speaker sarcasm. This interpretation of the present finding requires further investigation.

Finally, the discourse context also affects the interpretation of laughter timing. The most natural occurrence of laughter is immediately following a joke, i.e. in a non-sarcastic wordplay [28]. It is the intended (and preferred) response after a joke’s punchline [29]. Our data confirms that the humorous context was indeed conducive to the perception of the laughter response as less sarcastic and more genuine. On the other hand, sarcasm is typically a disaffiliative act (despite the fact that it may not necessarily have a negative interpersonal effect, [30]) and is therefore more likely to be responded to by disaffiliative laughter [24], [31], a pattern which is also present in our data.

Taken together, the results of the present study indicate that turn timing actively contributes to the creation of pragmatic meaning in conversation [7], [22-24]. While the pragmatics of early timing may depend on the type of response, the pragmatics of late timing appears to generally indicate dispreferred, disaffiliative meanings across a range of verbal and vocal responses.

REFERENCES

- [1] Jefferson, G. (2004). A note on laughter in ‘male–female’ Interaction. *Discourse Studies*, 6(1), 117–133.
- [2] Vettin, J., Todt, D. (2004). Laughter in Conversation; Features of Occurrence and Acoustic Structure. *Journal of Nonverbal Behaviour*, 28, 93–115.
- [3] Tanaka, H., Campbell, N. (2014). Classification of social laughter in natural conversational speech. *Computer, Speech and Language*, 28, 314–325.
- [4] Truong, K. P., Trouvain, J. (2014). Investigating prosodic relations between initiating and responding laughs. *Proceedings of the 15th Annual Conference of the International Speech Communication Association (INTERSPEECH 2014)*, 1811–1815.
- [5] Bryant G. A. et al. (2016). Detecting affiliation in co-laughter across 24 societies. *Proceedings of the National Academy of Sciences*, 113(17), 4682–4687.
- [6] Levinson, S. C., Torreira, F. (2015). Timing in turn-taking and its implications for processing models of language. *Frontiers in Psychology*, 6.
- [7] Sacks, H. (1974). An analysis of the course of a joke’s telling in conversation. In: R. Baumann, J. Sherzer (eds.) *Explorations in the Ethnography of Speaking*, Cambridge: CUP.
- [8] Wilson, T. P., Zimmerman, D. H. (1986). The structure of silence between turns in two-party conversation. *Discourse Processes*, 9, 375–390.
- [9] Wilson, M., Wilson, T. P. (2005). An oscillator model of the timing of turn-taking. *Psychonomic Bulletin and Review*, 12(6), 957–968.
- [10] Heritage, J. (1984). A change-of-state token and aspects of its sequential placement. In: J Maxwell Atkinson, J. Herit (eds.) *Structure of social action*. Cambridge: CUP.
- [11] Kendrick, K. H., Torreira, F. (2015). The timing and construction of preference: A quantitative study. *Discourse Processes*, 52, 255–289.
- [12] Trouvain, J., Truong, K. P. (2013). Exploring sequences of speech and laughter activity using visualisations of conversations. *Workshop on Affective Social Speech Signals*.
- [13] Rathcke, T., Fuchs, S. (2022). Laugh is in the air: An exploratory analysis of laughter during speed dating. *Frontiers in Communication*, 7.
- [14] Provine, R. R., Emmorey, K. (2006). Laughter among deaf signers. *Journal of Deaf Studies and Deaf Education*, 11(4), 403–409.
- [15] Clift, R. (2016). Don’t make me laugh: Responsive laughter in (dis)affiliation. *Journal of Pragmatics*, 100, 73–88.
- [16] Bachorowski, J.-A., Owren, M., J. (2001). Not all laughs are alike: Voiced but not unvoiced laughter readily elicits positive affect. *Psychological Science*, 12(3), 252–257.
- [17] Kohler, K. J. (2008). ‘Speech-smile’, ‘speech-laugh’, ‘laughter’ and their sequencing in dialogic interaction. *Phonetica*, 65(1–2), 1–18.
- [18] Trouvain, J. (2003). Segmenting phonetic units in laughter. *Proceedings of the 15th International Congress of Phonetic Sciences*.
- [19] Grammer, K., Eibl-Eibesfeldt, I. (1990). The ritualisation of laughter. *Natürlichkeit der Sprache und der Kultur*, 18, 192–214.
- [20] Ruch, W., Ekman, P. (2001). The expressive pattern of laughter. In: A. Kaszniak (ed.) *Emotions, Qualia, and Consciousness*, 10, World Scientific.
- [21] Levinson, S. C. (2013). Recursion in Pragmatics. *Language*, 89(1), 149–162.
- [22] Dynel, M. (2017). Academics vs. American scriptwriters vs. academics: A battle over the etic and emic ‘sarcasm’ and ‘irony’ labels. *Language Communication*, 55, 69–87.
- [23] Kapogianni, E. (2021). Types and Definitions of Irony. In: P. Stalmaszczyk (ed.) *The Cambridge Handbook of the Philosophy of Language*, Cambridge: CUP, pp. 622–638.
- [24] Truong, K. P., Trouvain, J. (2012). On the acoustics of overlapping laughter in conversational speech. *Proceedings of the 13th Annual Conference of the International Speech Communication Association (INTERSPEECH 2012)*, 851–854.
- [26] Bachorowski, J.-A., Smoski, M. J., Owren, M. J. (2001). The acoustic features of human laughter. *Journal of the Acoustical Society of America*, 110(3), 1581–1597.
- [27] Boswijk, V., Coler, M. (2020). What is Saliency? *Open Linguistics*, 6,(1), 713–722.
- [28] Gervais, M., Wilson, D. S. (2005). The evolution and functions of laughter and humor: a synthetic approach. *Quarterly Review in Biology*, 80(4), 395–430.
- [29] Norrick, N. R. (2003). Issues in conversational joking. *Journal of Pragmatics*, 35, 1333–1359.
- [30] Partington, A. (2006) *The Linguistics of Laughter*. Routledge.
- [31] Hanks, E., Egbert, J. (2022). The Interplay of Laughter and Communicative Purpose in Conversational Discourse: A Corpus-Based Study of British English. *Corpus Pragmatics*, 6(4), 261–290.