Temporal distribution of laughter in conversation

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1 Introduction

Laughter, as component of social interaction, has attracted interest within conversational analysis [2, 5]. While laughter can be expressed in different contexts, voluntary or involuntary [6], and diverse in function and degree of functionality [2], it is not random. We study timing of laughter during conversation in relation to topic changes: whether recurrent patterns in laughter distribution with respect to topic changes exist; whether laughter is a reliable topic termination cue. Others also approach this problem [3, 4]. Regularities have been analyzed in the occurrence of shared and not-shared laughter and their different conversational functions [3]. From a large collection of instances two persistent patterns are noted: shared laughter is often associated with topic termination and solo laughter, topic continuation. It has been observed that laughter invites reciprocal laughter [5]; however, Holt qualifies this with analysis of cases in which the listener seemingly refuses the laugh-invitation by continuing the topic with further information, instead.

Keeping in mind Holt's analysis [3, 4], we explore a corpus of multiparty spontaneous chat[1] approaching the problem in two steps: at a coarse-grained level, we analyze the temporal distribution of laughter with respect to topic boundaries; then, at a finer level we will analyze the differences in distribution of shared and solo laughter. The two main points of our work can be summarized by these two questions: I) how laughter is distributed around topic boundaries? II) is there evidence of the "shared laughter-topic termination" relation and of "solo laughter-topic continuation" relation?

2 Distribution of Laughter: analysis

In order to answer to (I), we analyze the temporal distribution of laughter in the before mentioned corpus. The total number of laughter is 713, counting shared and solo laughter. We examine the left and right sides of topic boundaries. Holding the topic change as the central event (hereafter, T-event), we individuate the position of the last laugh (LL) as the last laugh in the previous topic preceding T-event, and the first laugh (FL), as the first laugh following T-event in the new topic (Fig. 1 - left). Given this structure, we calculated the temporal distances (μ) between LL and T-event (μ(LT)) and FL and T-event (μ(TL)), noticing that LLs tend to occur at a shorter temporal distance from the T-event, than FLs. In other words, LT segments are statistically significantly shorter than TL segments (Fig. 1 - right).[2] In this corpus, laughter is more likely as the temporal (and content) distance from the topic boundary increases.

Addressing (II), recall that Holt 2010 [3] notes a clear distinction between shared laughter and solo laughter[3]. Shared laughter is linked with topic termination: it cannot be considered as an independent topic-closing cue, but it may be a supplemental indicator of a topic closing when it occurs in a sequence that is already potentially termination relevant. We repeated the previous analysis of μ(LT) vs μ(TL), distinguishing shared (SH) vs solo (SO) laugh. We focus on the topic termination left neighborhood (μ(LT)). Results of this analysis are reported in Table 2: the median distance between SH laughter and T-event is 4 sec, against the 13 seconds median distance between SO and T-event. SH laughter, rather than SO, tends to occur near a topic termination, and seems to fall in the time-frame that represents Schegloff's termination exchange sequence [7]. Thus, we can argue (supporting Holt) that given a topic termination, it is more likely to find a SH rather than a SO laughter in the termination exchange sequence. Again, this does not mean that SH are sufficient to cue topic termination, but their presence can be a further indicator of a topic termination sequence.

[1] The corpus [1] records conversation in English, including non-natives, among five individuals over three sessions. To our purpose all three days have been used for a total length of about 3h 30, 31523 tokens and 5980 turns. Transcripts present a specific tag for laugh (@w)

[2] One tail wilcox.test, alternative less: p-value = 2.418e-11.

[3] In this study, we define shared laughter situations in which at least two speakers overlap laughing.

Class	Mean	Median
SH-LT	6.36 sec	4 sec
SO-LT	27.58	13 sec
SO-LT U SH-LT	12.75 sec	7 sec

Table 1: LT distances wrt SH and SO laugh

Class	Mean	Median	Position
SH	1.32	0	WI
SO	0.9	0.5	WI
SH	2.7	2	WO
SO	1.19	1	WO

Table 2: SH vs SO distribution in wi and wo

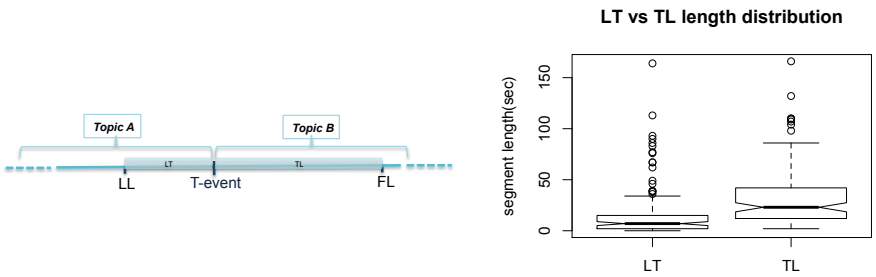

Figure 1: Topic boundary neighbourhood (left) and LT-TL comparison (right)

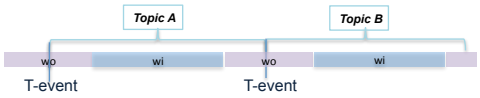

Figure 2: Inter/intra topic segmentation

The second statement in Holts analysis is the relation between solo laughter and topic continuation. In order to investigate this, we analyze the distribution of solo laughter, exploring whether it is more likely to find a SO rather than a SH in relation with a topic continuation segment of the conversation. We divide the corpus in intra topic sections (*wi* segments) and inter topic sections (*wo* segments), where *wi* are defined as the central half of a topic (by definition, those segments do not include a topic change), and *wo* sections as the remaining segments of the corpus overlapping a topic boundary (Fig. 2). If solo laughter are related to topic continuation, we should expect an higher number of SO in topic continuation segments (*wi*), rather than in topic transition segments (*wo*); however, this is not the case (2): there is no significant difference in the distribution of SO laughter among *wi* and *wo* sections. Moreover there is no significant difference between the distribution of SH laughter and SO laughter in intra topic segments, meaning that both (SH and SO) can equally occur in the context of a topic continuation.

3 Conclusions

With respect to I), we find an higher probability of finding a laughter as the distance from the topic boundary increases. With respect to II), we notice that shared laughter tends to occur as topic terminations approach, more than solo laughter; although neither shared nor solo laughter are reliable indicators of topic termination in isolation, shared laughter, more than solo, can contribute (with other features) to constitute a topic termination exchange. Finally, we did not find clear evidence supporting a relation between solo laugh and topic continuation; on the contrary, shared laughter seems to be equally followed by topic continuation utterances. Further studies could be conducted for exploring the nature of those solo laughter (invitation to laugh [5], embarrassment [2]). Next steps will involve also the analyses of different corpora.

References

[1] Nick Campbell. An audio-visual approach to measuring discourse synchrony in m ultimodal conversation data. In *Proceedings of Interspeech 2009*, 2009.

[2] P. Glenn. *Laughter in Interaction*. Studies in Interactional Sociolinguistics. Cambridge University Press, 2003.

[3] Elizabeth Holt. The last laugh: Shared laughter and topic termination. *Journal of Pragmatics*, 42(6):1513–1525, June 2010.

[4] Elizabeth Holt and Paul Drew. Figurative pivots: The use of figurative expressions in pivotal topic transitions. *Research on Language and Social Interaction*, 38(1):35–61, January 2005. UoA 57 (English Language and Literature).

[5] Gail Jefferson. A technique for inviting laughter and its subsequent acceptance/declination. In G Psathas, editor, *Everyday language: Studies in ethnomethodology.*, pages 79–96. Irvington Publishers: New York,NY, 1979.

[6] Mario F. Mendez Mendez, Tomoko V. Nakawatase, and Charles V. Brown. Involuntary laughter and inappropriate hilarity. *The Journal of Neuropsychiatry and Clinical Neurosciences*, 11:253–258, 1999.

[7] E.A. Schegloff. *Sequence Organization in Interaction: Volume 1: A Primer in Conversation Analysis*. Sequence Organization in Interaction: A Primer in Conversation Analysis. Cambridge University Press, 2007.